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ABSTRACT

The duties and tasks found in these task lists form the basis of instructional content for secondary, postsecondary, and adult occupational training programs for industrial occupations. The industrial occupations are divided into eight clusters. The clusters and occupations are: construction cluster (bricklayer, carpenter, building maintenance worker, electrician, maintenance painter, plumber/pipefitter), electronics cluster (computer repair technician, electrical and electronic technician), drafter/computer-aided drafter, transportation cluster (auto mechanic, diesel mechanic), manufacturing cluster (machine tool operator, machinist, tool and die maker, punch press operator, sheet metal worker, combination welder, maintenance repairer, automated manufacturing systems technician), bus driver, truck driver, and auto body repairer. Matrices for each cluster list the duties and tasks and indicate which occupations include that duty or task. Each cluster also includes a list of employability skills that are important for all occupations. (YLB)

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Education For Employment Task Lists

Illinois State Board of Education

Adult Vocational and Technical Education

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INDUSTRIAL OCCUPATIONS

CE045139

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Education For Employment Task Lists

Illinois State Board of Education

Adult Vocational and Technical Education

INDUSTRIAL OCCUPATIONS

CONSTRUCTION CLUSTER

Bricklayer

Carpenter

Building Maintenance Worker

Electrician

Maintenance Painter

Plumber/Pipefitter

*Employability Skills

*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

CONSTRUCTION CLUSTER MATRIX

B = Bricklayer
C = Carpenter
M = Building Maintenance Worker
E = Electrician
MP = Maintenance Painter
PP = Plumber/Pipefitter

APPLYING SAFETY PRACTICES

		B	C	M	E	MP	PP
1	Comply with shop and equipment safety rules	X	X	X	X	X	X
2	Apply basic emergency first aid techniques	X	X	X	X	X	X
3	Complete accident reports	X	X	X	X	X	X
4	Inspect workplaces for safe working environment	X	X	X	X	X	X
5	Report shop, environmental and equipment safety violations	X	X	X	X	X	X
6	Demonstrate use of fire extinguishers	X	X	X	X	X	X
7	Participate in disaster control exercises	X	X	X	X	X	X
8	Participate in shop safety committees	X	X	X	X	X	X
9	Correct safety hazards	X	X	X	X	X	X
10	Demonstrate cardiopulmonary resuscitation techniques	X	X	X	X	X	X
11	Participate in safety training programs	X	X	X	X	X	X
12	Evaluate personnel safety violations	X	X	X	X	X	X

PERFORMING SUPERVISORY FUNCTIONS

		B	C	M	E	MP	PP
1	Determine availability of machines, supplies and materials	X	X	X	X	X	X
2	Requisition, schedule and distribute supplies and materials	X	X	X	X	X	X
3	Coordinate workers with work to be done	X	X	X	X	X	X
4	Schedule and control shop flow of jobs	X	X	X	X	X	X
5	Maintain files	X	X	X	X	X	X
6	Maintain service records	X	X	X	X	X	X
7	Maintain labor records	X	X	X	X	X	X
8	Maintain warranty records	X	X	X	X	X	X
9	Explain work requirements	X	X	X	X	X	X
10	Inventory supplies and equipment	X	X	X	X	X	X
11	Maintain charts, tables, graphs or status boards on work scheduled	X	X	X	X	X	X
12	Check job/time cards	X	X	X	X	X	X
13	Inspect shop equipment and arrange for maintenance and repair work	X	X	X	X	X	X
14	Follow up employee reports of problems or equipment failures	X	X	X	X	X	X
15	Draft correspondence	X	X	X	X	X	X
16	Inspect quality of brickwork	X					
17	Order masonry supplies and equipment	X					
18	Orient new employees	X	X	X	X	X	X
19	Prepare bids for contract masonry work	X					
20	Prepare masonry budgets	X					
21	Prepare estimate of brickwork	X					
22	Compute average cost rates for work performed	X	X	X	X	X	X
23	Determine actual costs of work completed	X	X	X	X	X	X
24	Write work schedules	X	X	X	X	X	X
25	Write technical reports	X	X	X	X	X	X
26	Plan and implement technical training for employees	X	X	X	X	X	X

	B	C	M	E	MP	PP
27 Evaluate employee progress and performance	X	X	X	X	X	X
28 Interview job applicants	X	X	X	X	X	X
29 Hire workers	X	X	X	X	X	X
30 Fire workers	X	X	X	X	X	X
31 Conduct meetings	X	X	X	X	X	X

PERFORMING HOUSEKEEPING AND RECORDKEEPING ACTIVITIES

	B	C	M	E	MP	PP
1 Clean and maintain work area and leave in safe condition	X	X	X	X	X	X
2 Follow tool crib procedures	X	X	X	X	X	X
3 Report problems to supervisor	X	X	X	X	X	X
4 Complete time cards	X	X	X	X	X	X
5 Complete job status reports	X	X	X	X	X	X
6 Make equipment failure reports	X	X	X	X	X	X
7 Determine basic maintenance procedures using manuals	X	X	X	X	X	X
8 Plan sequence of work operations	X	X	X	X	X	X
9 Use technical references	X	X	X	X	X	X
10 Participate in a participative management program (Quality Circles)	X	X	X	X	X	X

CONDUCTING SHOP OPERATIONS

	B	C	M	E	MP	PP
1 Answer customer questions	X	X	X	X	X	X
2 Troubleshoot customer problems	X	X	X	X	X	X
3 Perform public relations activities	X	X	X	X	X	X
4 Maintain records of service tools and equipment	X	X	X	X	X	X
5 Unpack and inspect new equipment	X	X	X	X	X	X
6 Receive and store parts and supplies	X	X	X	X	X	X
7 Update parts catalogs	X	X	X	X	X	X
8 Modify wiring diagrams to reflect repair changes		X	X	X		
9 Make out material lists used on each job	X	X	X	X	X	X
10 Complete work orders	X	X	X	X	X	X

ESTIMATING MATERIALS

	B	C	M	E	MP	PP
1 Estimate forming materials	X	X	X			
2 Estimate concrete	X	X	X			
3 Estimate concrete blocks	X	X	X			
4 Estimate rough framing materials	X	X	X			
5 Estimate roofing materials		X	X			
6 Estimate windows		X	X			
7 Estimate doors and jambs		X	X			
8 Estimate interior underlayment		X				
9 Estimate interior panels		X	X			
10 Estimate stairway materials		X	X			
11 Estimate closet accessories		X	X			
12 Estimate acoustical ceiling materials		X	X			
13 Estimate prefabricated cabinets		X	X			
14 Estimate materials for built-ins		X	X			
15 Estimate finish hardware		X	X			
16 Estimate siding		X	X			
17 Estimate cost of jobs	X	X	X	X	X	X

PREPARING BUILDING SITE

	B	C	M	E	MP	PP
1 Establish elevation reference points from bench mark	X	X				
2 Establish footing grades	X	X				
3 Locate and square corners	X	X				
4 Install batter boards	X	X				
5 Set grade stakes	X	X				
6 Lay out buildings using transit	X	X				

PREPARING FOUNDATIONS AND FOOTINGS

	B	C	M	E	MP	PP
1 Build footings	X	X				
2 Build forms for concrete	X	X				
3 Construct piers	X					
4 Construct walls containing pilasters	X					
5 Raise foundations	X					
6 Waterproof foundations	X	X				
7 Construct stud and sheathing wall forms	X	X				
8 Erect plywood panel wall forms	X	X				
9 Erect manufactured wall forms	X	X				
10 Construct stair forms	X	X				
11 Strip forms	X	X				
12 Install beams	X	X				
13 Install anchor bolts in concrete	X					
14 Install anchor bolts in concrete blocks	X					
15 Install bulkheads	X	X				
16 Install keyway for footings and foundations	X	X				

LAYING, JOINTING AND POINTING BRICK

	B	C	M	E	MP	PP
1 Bond walls	X					
2 Build Gothic archs	X					
3 Build jack archs	X					
4 Build Roman archs	X					
5 Build segmental archs	X					
6 Build soldier archs	X					
7 Build Tudor archs	X					
8 Build corner brick columns	X					
9 Build rectangular brick columns	X					
10 Build round brick columns	X					
11 Build square brick columns	X					
12 Clean brick walls	X		X			
13 Construct brick veneer walls	X		X			
14 Construct cavity walls	X					
15 Cut bat closures	X					
16 Cut queen closures	X					
17 Form corbels	X					
18 Gage masonry walls with mortar scale	X					
19 Gage masonry walls with story pole	X					
20 Lay basket weave patterns	X					
21 Lay common bond patterns	X					
22 Lay diamond patterns	X					
23 Lay Dutch bond patterns	X					
24 Lay Flemish bond patterns	X					
25 Lay header courses	X					
26 Lay herringbone bond patterns	X					

	B	C	M	E	MP	PP
27 Lay rowlock courses	X					
28 Lay sailor courses	X					
29 Lay shiner courses	X					
30 Lay soldier courses	X					
31 Lay stack bond patterns	X					
32 Lay stretcher courses	X					
33 Lay American bond patterns	X					
34 Lay English bond patterns	X					
35 Lay fine bricks with clay	X					
36 Tool concave joints	X					
37 Tool convex joints	X					
38 Lay corners	X					
39 Tool rake joints	X		X			
40 Tool squeeze joints	X		X			
41 Tool V joints	X		X			
42 Mix cement mortar	X		X			
43 Mix mortar by hand	X		X			
44 Mix mortar with power mixer	X		X			
45 Point walls	X		X			
46 Reinforce brick masonry	X		X			
47 Tie doors to walls using anchors	X		X			
48 Tie walls together using anchors	X		X			
49 Cut bricks using masonry saw	X		X			
50 Cut bricks using partner saw	X		X			
51 Cut brick blocks using brick hammer	X		X			
52 Cut brick blocks using brick set	X		X			
53 Figure pitch using framing square	X		X			
54 Figure runs of rakes using framing square	X		X			
55 Mix slack lime mortar	X		X			

CONSTRUCTING RESIDENTIAL CHIMNEYS AND FIREPLACES

	B	C	M	E	MP	PP
1 Build double face chimneys	X					
2 Build single face chimneys	X					
3 Cut flue linings	X					
4 Install ash dumps	X					
5 Install clean-out doors	X					
6 Insert dampers	X					
7 Install heatilators	X					
8 Lay hearths	X					
9 Lay mantels	X					
10 Lay throats	X					
11 Lay backs of fireplaces	X					
12 Lay bottoms of fireplaces	X					
13 Lay sides of fireplaces	X					
14 Set flues	X					
15 Install log lighters	X					

CONSTRUCTING MASONRY BUILDINGS

	B	C	M	E	MP	PP
1 Build partitions	X		X			
2 Construct jambs	X		X			
3 Construct sills	X		X			
4 Damp proof walls	X		X			
5 Install wall ties	X		X			

	B	C	M	E	MP	PP
6 Lay flight of steps	X					
7 Make reinforced lintels	X					
8 Place beams	X					
9 Set door frames	X		X			
10 Set lintels	X		X			
11 Set windows	X		X			

CONSTRUCTING CONCRETE MASONRY

	B	C	M	E	MP	PP
1 Lay concrete blocks	X		X			
2 Lay running bond patterns in concrete masonry	X					
3 Lay vertical bond patterns in concrete masonry	X					
4 Pour concrete	X		X			
5 Screed concrete	X		X			
6 Finish concrete	X		X			

PERFORMING MISCELLANEOUS MASONRY WORK

	B	C	M	E	MP	PP
1 Construct manholes	X					
2 Construct planters	X		X			
3 Construct water fountains	X		X			
4 Fireproof beams	X		X			
5 Fireproof walls	X		X			
6 Install flashing	X		X			
7 Lay glass blocks	X		X			
8 Lay masonry driveways	X					
9 Lay masonry floors	X		X			
10 Lay masonry walks	X		X			
11 Lay ornamental lattice pattern walls	X					
12 Lay structural clay tiles	X					
13 Repair masonry work	X		X			
14 Set stones	X		X			
15 Set precast panels	X					
16 Anchor precast panels by welding, bolting or clamping	X					

SHARPENING TOOLS

	B	C	M	E	MP	PP
1 Sharpen wood chisels		X	X			
2 Hone plane irons		X	X			
3 Sharpen circular saw blades		X	X			
4 Sharpen twist drills		X	X			
5 Sharpen auger bits		X	X			

INSTALLING ROUGH FRAMING

	B	C	M	E	MP	PP
1 Stack lumber		X				
2 Install sill plates		X	X			
3 Frame walls		X				
4 Align and brace walls		X				
5 Construct plywood box beams		X				
6 Install diagonal wind bracing		X				
7 Frame floor openings		X				
8 Frame door openings		X				
9 Frame window openings		X				

	B	C	M	E	MP	PP
10 Frame roof openings		X				
11 Frame built-up stringers		X				
12 Frame cleated stair stringers		X				
13 Install floor joists		X				
14 Install cross-bridging		X				
15 Install ceiling joists		X				
16 Construct post and beam frames		X				
17 Install steel beams		X				
18 Install lally posts		X				
19 Install backing for hanging fixtures and cabinets		X	X			
20 Install exterior wall sheathings		X				
21 Install battens		X				
22 Install plyscore sub-floors		X	X			
23 Install diagonal sub-floors		X	X			
24 Install underlayment over sub-floors		X	X			
25 Install metal studs		X				
26 Set metal door frames for masonry construction		X	X			
27 Set metal window frames for masonry construction		X	X			
28 Construct roof trusses		X				
29 Install collar beams		X				
30 Install overhang purlins		X				
31 Install rafter support purlins		X				
32 Install ridgeboards		X				
33 Install common rafters		X				
34 Install tail rafters		X				
35 Install cripple jack rafters		X				
36 Install hip rafters		X				
37 Install hip jack rafters		X				
38 Install valley rafters		X				
39 Install valley jack rafters		X				
40 Install gambrel roof rafters		X				
41 Frame dormers without sidewalls		X				
42 Frame dormers with sidewalls		X				
43 Frame roof saddles		X				
44 Frame snub gables		X				
45 Install gable studs		X				
46 Construct intersecting gable roofs		X				
47 Install roof sheathings		X	X			

INSTALLING ROOF COMPONENTS

	B	C	M	E	MP	PP
1 Install roofing felts		X	X			
2 Install chimney flashs		X	X			
3 Install valley flashs		X	X			
4 Install composite strip shingles		X	X			
5 Install composite shingles on ridge cap		X	X			
6 Install composite shingles in valley		X	X			
7 Install composite shingles around roof opening		X	X			
8 Install shingles over dormers or roof appendages		X	X			
9 Install roof vents		X	X			
10 Install ridge vents		X	X			
11 Install skylights		X	X			
12 Install wood shingles/shakes		X	X			
13 Install wood shingles/shakes on ridge cap		X	X			
14 Install wood shingles/shakes in valley		X	X			

	B	C	M	E	MP	PP
15 Install wood shingles/shakes around roof opening		X	X			
16 Install gutters		X	X			
17 Install downspouts		X	X			

INSTALLING EXTERIOR FINISHES

	B	C	M	E	MP	PP
1 Construct box cornice		X				
2 Construct rake cornice		X				
3 Case exterior opening		X				
4 Install wood jamb window units		X	X			
5 Hang exterior doors		X	X			
6 Install exterior door jambs		X	X			
7 Install metal corners for aluminum or vinyl siding		X	X			
8 Install corner boards for wood siding		X	X			
9 Install wood fascia		X	X			
10 Install wood soffit		X	X			
11 Install aluminum fascia		X	X			
12 Install aluminum soffit		X	X			
13 Install prefabricated columns		X	X			
14 Install garage doors		X	X			
15 Install metal siding		X	X			
16 Install vinyl siding		X	X			
17 Install composition siding		X	X			
18 Install prefabricated storm doors		X	X			
19 Install prefabricated storm windows		X	X			
20 Install drip caps		X	X			
21 Install bevel siding		X	X			
22 Install lap siding		X	X			
23 Install wood shingle siding		X	X			
24 Install outside corners of wood shingle siding		X	X			
25 Install panel siding		X	X			
26 Construct and install wood louvers		X	X			
27 Install exterior shutters		X	X			

INSTALLING INTERIOR FINISHES

	B	C	M	E	MP	PP
1 Install batt insulations		X	X			
2 Install vapor barriers		X	X			
3 Install wall panels		X	X			
4 Assemble prefabricated cabinets		X	X			
5 Install closet accessories		X	X			
6 Install interior door jambs		X	X			
7 Construct built-in cabinets		X	X			
8 Install shelves		X	X			
9 Install baseboards		X	X			
10 Install ceiling molds		X	X			
11 Hang drywalls		X	X			
12 Case interior openings		X	X			
13 Hang interior doors		X	X			
14 Install prehung split jamb door units		X	X			
15 Install double-acting doors		X	X			
16 Install folding (accordian) doors		X	X			
17 Install sliding doors		X	X			
18 Install bi-fold doors		X	X			
19 Install pocket doors		X	X			

	B	C	M	E	MP	PP
20 Install cylinder locksets		X	X			
21 Install mortise locksets		X	X			
22 Install door closers		X	X			
23 Install door holders		X	X			
24 Install panic bars		X	X			
25 Install flush bolts		X	X			
26 Install door plates		X	X			
27 Install weatherstripping		X	X			
28 Install wall cabinets		X	X			
29 Install base cabinets		X	X			
30 Install recessed medicine cabinets		X	X			
31 Install thresholds		X	X			
32 Install gypsum lathes		X	X			
33 Install corner beading for lathes		X	X			
34 Install plaster grounds		X	X			
35 Install parquet flooring		X	X			
36 Install plank flooring		X	X			
37 Install tongue and groove flooring		X	X			
38 Install suspended T-grid ceiling		X	X			
39 Install suspended concealed grid ceiling		X	X			
40 Install tongue and groove ceiling tiles		X	X			

ASSEMBLING AND CONSTRUCTING STAIRS

	B	C	M	E	MP	PP
1 Install prefabricated stairs		X	X			
2 Install disappearing stair unit		X	X			
3 Construct open riser stairs		X	X			
4 Construct box stairs		X	X			
5 Install wood newel post, balusters and railings		X	X			
6 Install metal newel post and railings		X	X			

SELECTING ELECTRICAL MATERIALS AND DETERMINING WORK TO BE DONE

	B	C	M	E	MP	PP
1 Locate and lay out devices for job from a blueprint or schematic diagram			X	X		
2 Figure materials list from blueprint or schematic diagram			X	X		
3 Determine governing codes			X	X		
4 Determine type and size for splice and device boxes and covers			X	X		
5 Select location of inside panels and boxes				X		
6 Select type and size of wires			X	X		
7 Select mounting devices			X	X		
8 Select equipment disconnects				X		
9 Determine panelboards				X		
10 Select ground fault protections				X		
11 Select service entrance				X		
12 Select receptacles			X	X		
13 Select connectors			X	X		
14 Determine electrical insulations				X		
15 Determine physical protection of conductors			X	X		

COMPUTING SERVICE LOADS

	B	C	M	E	MP	PP
1 Balance the total load per phase			X	X		
2 Calculate individual circuit loads			X	X		
3 Calculate load in watts and load current in amps for entire job			X	X		
4 Compute size of service entrance conductors				X		
5 Design electrical systems				X		
6 Determine number of outlets per circuit			X	X		
7 Determine ground fault circuits			X	X		
8 Determine cost and practicality of underground or overhead service				X		
9 Determine location of inside panels and boxes			X	X		

INSTALLING ELECTRICAL ENVIRONMENTAL CONTROL COMPONENTS

	B	C	M	E	MP	PP
1 Install baseboard heat units			X	X		
2 Connect ceiling heating cables to thermostat			X	X		
3 Connect central electric heaters			X	X		
4 Connect furnace motors			X	X		
5 Connect line voltage thermostats			X	X		
6 Connect low voltage thermostats			X	X		
7 Install wall heaters			X	X		
8 Connect wiring for boiler control system				X		
9 Install ceiling heating cables			X	X		
10 Install central electric heaters				X		
11 Install furnace motors			X	X		
12 Install individual space heaters			X	X		
13 Install vent fans			X	X		
14 Install air conditioning units			X	X		
15 Install electrical environmental control systems				X		

INSTALLING LIGHTING FIXTURES

	B	C	M	E	MP	PP
1 Install flood lights			X	X		
2 Install incandescent lighting fixture dimmers			X	X		
3 Install fluorescent lighting fixture dimmers			X	X		
4 Install heat-a-vent lights				X		
5 Install light fixtures			X	X		
6 Install photo-electric controls on light			X	X		
7 Install post lights			X	X		
8 Install power failure lighting			X	X		
9 Install delayed lighting switches				X		
10 Install low-voltage lighting controls				X		
11 Install moisture resistant fixtures			X	X		
12 Install appliance pilot lights			X	X		
13 Install fan controlled by switch			X	X		
14 Install 110 volt light fixtures			X	X		
15 Select and install lighting control devices			X	X		
16 Connect incandescent lighting fixtures			X	X		
17 Connect fluorescent lighting fixtures			X	X		
18 Install single pole light circuits with 3-way switches			X	X		
19 Install single pole light circuits with 4-way switches			X	X		
20 Install remote control light circuits				X		

INSTALLING SERVICE ENTRANCE

	B	C	M	E	MP	PP
1 Ground service entrance equipment				X		
2 Install circuit breakers in panel				X		
3 Install main service panel				X		
4 Install mast-type service entrance				X		
5 Install main service disconnect				X		
6 Install mobile home service				X		
7 Install service entrance cable to service drop				X		
8 Install temporary service entrance				X		
9 Install underground service entrance				X		

INSTALLING SWITCH BOXES AND OUTLET BOXES

	B	C	M	E	MP	PP
1 Install bar-hanger mounted boxes				X		
2 Install flush mounted junction boxes				X		
3 Install flush mount switches and outlet boxes in drywall			X	X		
4 Install flush mount switches and outlet boxes in lath and plaster wall			X	X		
5 Install flush mount switches and outlet boxes in paneled wall			X	X		
6 Install flush mount switches and outlet boxes in masonry wall			X	X		
7 Install gangable boxes			X	X		
8 Install octagon outlet boxes			X	X		
9 Install receptacles and switches in existing wall			X	X		
10 Install recessed fixture housings in ceiling			X	X		
11 Install surface mount junction boxes			X	X		
12 Install underground, watertight, cast-iron boxes				X		

MAINTAINING EXISTING WIRING

	B	C	M	E	MP	PP
1 Repair automatic control systems				X		
2 Repair fire alarm stations (must be state licensed)				X		
3 Repair fluorescent fixtures			X	X		
4 Repair heating system controls				X		
5 Repair lights			X	X		
6 Repair relays and timers			X	X		
7 Repair solenoids in door chimes			X	X		
8 Repair water heaters			X	X		
9 Repair emergency lighting systems			X	X		
10 Repair frayed service cords			X	X		
11 Repair power failure lighting systems			X	X		
12 Replace existing interior load centers				X		
13 Replace cables			X	X		
14 Replace circuit breakers			X	X		
15 Replace existing receptacles and switches			X	X		
16 Replace float switches			X	X		
17 Replace thermostats			X	X		
18 Replace fuses			X	X		
19 Replace grounding electrode conductors				X		
20 Replace appliance pilot light bulbs			X	X		
21 Replace service entrances				X		
22 Replace transformers				X		
23 Test circuits for correct voltage			X	X		

		B	C	M	E	MP	PP
24	Troubleshoot branch circuits			X	X		
25	Determine electrical problems using available troubleshooting techniques			X	X		
26	Interpret control diagrams for electrical systems			X	X		
27	Diagnose malfunctions of electrical systems using available test and measurement equipment			X	X		
28	Measure and bend conduits			X	X		
29	Pull conductors through existing structures			X	X		
30	Test apparatus for operation			X	X		
31	Adjust apparatus and devices to specifications			X	X		
32	Test installations for mechanical integrities			X	X		
33	Replace circuit breakers			X	X		
34	Check for overloaded circuits			X	X		
35	Wire parallel circuits			X	X		
36	Wire series circuits			X	X		
37	Wire series-parallel circuits			X	X		

ROUGHING IN FEEDERS, BRANCH CIRCUIT CABLES AND CIRCUITS

		B	C	M	E	MP	PP
1	Rough in 120-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)				X		
2	Rough in 240-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)				X		
3	Rough in armored cables to outlet boxes				X		
4	Rough in cables between existing boxes and new boxes				X		
5	Rough in cables for branch circuits			X	X		
6	Rough in conduits for branch circuits			X	X		
7	Install devices controlled by two three-way switches with feed to switch box				X		
8	Install devices controlled by two three-way switches with feed to light box				X		
9	Install devices controlled by two three-way switches and one four-way switch with feed to three-way switch				X		
10	Install device controlled by two three-way switches and one four-way switch with feed to light				X		
11	Install device controlled by two three-way switches and two four-way switches with feed to three-way switch				X		
12	Rough in circuit for door chime system			X	X		
13	Rough in circuit for an intercom system			X	X		
14	Rough in line-voltage thermostat wiring			X	X		
15	Rough in low-voltage thermostat wiring			X	X		
16	Rough in non-metallic cable in outlet boxes			X	X		
17	Install pressure switches in existing well				X		
18	Install receptacles with two three-way switches controlling one half of two receptacles			X	X		
19	Install single pole switches controlling one or more devices with feed to switch box				X		
20	Install single pole switches controlling one or more devices with feed to light/device box				X		
21	Install single pole switches controlling three lights or devices with feed to end light box				X		
22	Install split circuit duplex receptacles				X		
23	Install two three-way switches controlling one device using conduit and 4" square boxes with plaster rings-circuitry and boxes				X		

	B	C	M	E	MP	PP
24 Install underground circuits				X		
25 Install underground direct burial cables				X		
26 Make up branch circuit wires to panels				X		
27 Rough in single pole switch circuits				X		
28 Run feeder cable from main service panel to auxiliary panel				X		
29 Make joints using crimp type connectors			X	X		
30 Make pigtail splices			X	X		
31 Make splices using mechanical-type connectors			X	X		
32 Make fixture splices			X	X		

TRIMMING OUT ELECTRICAL DEVICES AND APPLIANCES

	B	C	M	E	MP	PP
1 Install automatic garage door openers			X	X		
2 Connect door chime systems			X	X		
3 Connect duplex receptacles			X	X		
4 Install electric fence chargers				X		
5 Install emergency warning systems (burglar or fire - state license only)			X	X		
6 Install three-wire 220 volt receptacles				X		
7 Install four-wire 220 volt receptacles				X		
8 Install ground fault interrupting devices				X		
9 Install hot water heaters			X	X		
10 Install humidity control devices				X		
11 Connect intercom systems			X	X		
12 Connect low-voltage lighting controls			X	X		
13 Install photo-electric cell controls			X	X		
14 Connect recessed fixture boxes in ceiling			X	X		
15 Connect single pole switches			X	X		
16 Install single pole switches with pilot light			X	X		
17 Connect split circuit duplex receptacles			X	X		
18 Install timer or delayed action switches			X	X		
19 Connect water pump motors				X		
20 Connect wires from junction boxes to appliances			X	X		
21 Install three-way switches			X	X		
22 Install four-way switches			X	X		
23 Install surface raceways			X	X		
24 Install water pump motors				X		
25 Connect 120-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)				X		
26 Connect 240-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)				X		

INSTALLING AND MAINTAINING MOTORS

	B	C	M	E	MP	PP
1 Install split-phase motors			X	X		
2 Maintain split-phase motors			X	X		
3 Install capacitor start motors			X	X		
4 Maintain capacitor start motors			X	X		
5 Reverse the rotation of motors			X	X		
6 Install motor controls			X	X		
7 Maintain motor controls			X	X		
8 Change motors for running voltage			X	X		
9 Replace blower motors			X	X		
10 Replace furnace motors				X		

	B	C	M	E	MP	PP
11 Replace pump motors for well				X		
12 Service electric motors				X		

USING CLIMBING EQUIPMENT

	B	C	M	E	MP	PP
1 Inspect climbing equipment for safety	X	X	X	X	X	X
2 Set up ladders	X	X	X	X	X	X
3 Set up ladder jacks and planks	X	X	X		X	
4 Construct outrigger scaffolds	X	X	X		X	
5 Erect metal scaffolds	X	X	X		X	
6 Construct hanging and swinging scaffolds	X	X	X		X	
7 Erect suspended work platforms	X	X	X		X	
8 Set up Bosun's chairs					X	
9 Set up mobile and powered scaffolds	X	X	X		X	
10 Construct single-pole scaffolds	X	X	X		X	
11 Construct double-pole scaffolds	X	X	X		X	

PREPARING SURFACE FOR FINISHING

	B	C	M	E	MP	PP
1 Prepare surfaces for painting			X		X	
2 Prepare surfaces for papering			X		X	
3 Prepare wood surfaces for finishing			X		X	
4 Prepare concrete surfaces for finishing			X		X	
5 Prepare metal surfaces for finishing			X		X	
6 Prepare gypsum surfaces for finishing			X		X	
7 Prepare plaster surfaces for finishing			X		X	

USING COMPRESSOR AND SPRAY EQUIPMENT

	B	C	M	E	MP	PP
1 Lubricate compressors			X		X	
2 Adjust air regulators			X		X	
3 Select and use air and fluid hoses			X		X	
4 Apply paint with conventional spray gun			X		X	
5 Apply paint with airless spray gun			X		X	
6 Select and use respirators			X		X	
7 Clean spray equipment			X		X	

FINISHING SURFACES

	B	C	M	E	MP	PP
1 Mix primer			X		X	
2 Mix paint to desired color			X		X	
3 Clean surfaces using paint removal tools and sandpaper			X		X	
4 Fill holes and cracks			X		X	
5 Apply primer to surface to be painted			X		X	
6 Paint plaster or wall surfaces			X		X	
7 Paint concrete surfaces			X		X	
8 Paint metal surfaces			X		X	
9 Seal uncoated wood surfaces			X		X	
10 Paint uncoated wood surfaces			X		X	
11 Stain uncoated wood surfaces			X		X	
12 Apply varnish to wood surfaces			X		X	
13 Apply shellac to wood surfaces			X		X	
14 Apply lacquer to wood surfaces			X		X	
15 Clean area and equipment of finishing materials			X		X	

COVERING WALLS

	B	C	M	E	MP	PP
1 Estimate amount of wallpaper needed			X		X	
2 Cut wallpaper			X		X	
3 Prepare wall surfaces for wallpaper			X		X	
4 Apply wallpaper to walls			X		X	

MAINTAINING STRUCTURES

	B	C	M	E	MP	PP
1 Inspect structures for soundness			X		X	
2 Repair cracks			X		X	
3 Repair alligatoring			X		X	
4 Repair checking			X		X	
5 Repair blistering			X		X	
6 Repair peeling			X		X	
7 Repair flaking			X		X	
8 Remove mildew			X		X	
9 Repair nail head stains			X		X	
10 Repair peeling and flaking on metal gutters			X		X	
11 Repair flaking and chaulking masonry			X		X	
12 Apply protective wall coverings below grade			X		X	
13 Repaint walls and ceilings			X		X	
14 Remove and hang new wall coverings			X		X	
15 Refinish woodwork			X		X	
16 Refinish concrete			X		X	
17 Refinish metal			X		X	

JOINING PIPE

	B	C	M	E	MP	PP
1 Bend copper tubing with spring bender			X			X
2 Braze pipes with gas torch and filler metal			X			X
3 Join cast-iron pipes using lead and oakum						X
4 Cut cast-iron soil pipes with snap-type chain cutter						X
5 Cut concrete pipes						X
6 Cut copper tubing and pipes with hacksaw			X			X
7 Cut copper tubing and pipes with tubing cutter			X			X
8 Cut steel pipes with 4-wheel pipe cutter			X			X
9 Cut steel pipes with one-wheel cutter			X			X
10 Join cast-iron pipes to clay pipe						X
11 Join clay pipes with couplings						X
12 Join copper tubing to brass pipes			X			X
13 Join copper tubing/pipes to copper pipe/tubing			X			X
14 Join copper tubing/pipes to plastic pipes, using sweat method			X			X
15 Join copper tubing to steel pipes			X			X
16 Join copper tubing with compressed connectors			X			X
17 Join pipe with no-hub or band clamp couplings			X			X
18 Join plastic pipes to cast-iron pipes with no-hub couplings			X			X
19 Join plastic pipes using solvent cement method			X			X
20 Join plastic pipes to steel pipe			X			X
21 Join steel pipes to cast-iron pipes with no-hub couplings						X
22 Thread steel pipes with adjustable dies			X			X
23 Thread steel pipes with non-adjustable dies			X			X

	B	C	M	E	MP	PP
24 Thread steel pipes with power-driven vise stands			X			X
25 Join pipes with electric arc welders and filler metals			X			X
26 Weld pipes with oxyacetylene torches and filler materials			X			X

INSTALLING HANGARS AND SUPPORTS

	B	C	M	E	MP	PP
1 Install pipe sleeves or thimbles through walls, floors or ceilings			X			X
2 Secure horizontal and vertical lines of pipe to masonry surfaces with hangers			X			X
3 Secure horizontal and vertical lines of pipe to metal surfaces with hangers			X			X
4 Secure horizontal and vertical lines of pipe to wood surfaces with hangars			X			X

BUILDING WATER DISTRIBUTION LINES

	B	C	M	E	MP	PP
1 Install booster pumps in water supply lines						X
2 Install cut-off valves			X			X
3 Install cut-off valves in stop-and-waste box			X			X
4 Install expansion joints			X			X
5 Install hot or cold water storage tanks			X			X
6 Repair make-up water components on water cooling towers						X
7 Install pressure relief valves			X			X
8 Install water circulating pumps			X			X
9 Insulate water lines			X			X
10 Make water pressure tests on water supply systems			X			X
11 Rough-in water supply lines for bathtubs			X			X
12 Rough-in water supply lines for wall-mounted urinals			X			X
13 Rough-in water supply lines for water closets			X			X
14 Rough-in water supply lines for water heaters			X			X
15 Lay out trench lines						X

BUILDING DRAINS

	B	C	M	E	MP	PP
1 Backfill trenches						X
2 Calculate slope required for building sewer lines						X
3 Install drain pipes in trenches						X
4 Establish grade lines for installing plumbing						X
5 Install cleanouts on drains			X			X
6 Install float valves on water cooling towers						X
7 Install overflow pipes on water cooling towers						X
8 Install storm drains						X
9 Lay out house drains						X
10 Make water tests on building drains			X			X
11 Rough-in waste lines and vents for bathtubs			X			X
12 Rough-in waste lines and vents for built-in lavatories			X			X
13 Rough-in waste lines and vents for dishwashers			X			X
14 Rough-in waste lines and vents for floor-mounted water closets			X			X

	B	C	M	E	MP	PP
15 Rough-in waste lines for shower baths			X			X
16 Rough-in waste lines for wall-mounted urinals			X			X

INSTALLING TRAPS AND CLEANOUTS

	B	C	M	E	MP	PP
1 Install acid-proof traps			X			X
2 Install garbage disposal units			X			X
3 Install grease interceptors in waste lines			X			X
4 Install waste sinks for food-handling equipment			X			X

INSTALLING VENTS

	B	C	M	E	MP	PP
1 Install soil or waste back vents			X			X
2 Install vent terminals (roof-flashing)			X			X

INSTALLING FIXTURES

	B	C	M	E	MP	PP
1 Install built-in lavatories			X			X
2 Install dishwashers			X			X
3 Install drinking fountains			X			X
4 Install electric water heaters			X			X
5 Install flush valve-type water closets			X			X
6 Install gas water heaters			X			X
7 Install washing machines			X			X
8 Install shower bath accessories in ceramic tile baths			X			X
9 Install tank-type water closets			X			X
10 Install bathtubs			X			X
11 Install wall-mounted lavatories			X			X
12 Install wall-mounted urinals			X			X

INSTALLING/MAINTAINING HYDRONIC HEATING SYSTEMS

	B	C	M	E	MP	PP
1 Install cast iron sectional boilers						X
2 Install horizontal steel tube boilers						X
3 Install expansion tanks			X			X
4 Install finn tube radiation			X			X
5 Install cast iron baseboard radiation			X			X
6 Install circulating pumps			X			X
7 Install header and "hartford loops"						X
8 Select and install valves for heating system			X			X
9 Install steam traps						X
10 Replace relief valves			X			X
11 Repair circulating pumps			X			X
12 Troubleshoot control system for hot water boilers			X			X
13 Troubleshoot control system for steam boilers			X			X
14 Check for improper combustions			X			X
15 Repair leak in radiant floor coil systems			X			X
16 Clean and adjust gas burners			X			X
17 Check steam pressures for boiler malfunctions			X			X
18 Clean deposits from boilers			X			X

MAINTAINING PLUMBING SYSTEMS

		B	C	M	E	MP	PP
1	Clear obstructions from lavatory drains			X			X
2	Remove obstructions from main drain lines			X			X
3	Remove obstructions from water closet drains			X			X
4	Replace lavatory trap drains			X			X
5	Repair leaking shower valves			X			X
6	Repair leaking water faucets or valves			X			X
7	Repair water flush valves on water closets			X			X
8	Clean steam pressure regulator valves			X			X
9	Install prefabricated air chambers						X
10	Replace pressure control switches on water pumps			X			X
11	Replace section of galvanized water supply lines			X			X
12	Inspect fuel tank liners			X			X
13	Replace fuel tank liners			X			X

MAINTAINING THE OUTSIDE ENVIRONMENT

		B	C	M	E	MP	PP
1	Mow lawns			X			
2	Prune trees and shrubs			X			
3	Clean drives and walks of snow			X			
4	Water lawns			X			
5	Water inside plants			X			
6	Seed lawns			X			
7	Lay sod			X			
8	Control tree and shrub diseases			X			
9	Control tree and shrub insects			X			
10	Control lawn diseases			X			
11	Control lawn insects			X			
12	Control lawn weeds			X			
13	Plant trees and shrubs			X			
14	Fertilize lawns			X			
15	Rake and sweep lawns			X			
16	Aerate lawns			X			

EMPLOYABILITY SKILLS

DUTY A: Identifying Employment Opportunities

SKILLS:
1 Identify requirements for job
2 Investigate educational opportunities
3 Investigate occupational opportunities
4 Locate resources for finding employment
5 Confer with prospective employers
6 Identify job trends

DUTY B: Applying Employment Seeking Skills

SKILLS:
1 Locate job openings
2 Document skills and abilities (resume)
3 Prepare for interview
4 Participate in interview
5 Complete required tests
6 Complete required forms
7 Write application letter
8 Write follow-up letter
9 Write acceptance letter
10 Evaluate job offer
11 Evaluate job rejection

DUTY C: Interpreting Employment Capabilities

SKILLS:
1 Match interest to job area
2 Match aptitudes to job area
3 Verify abilities
4 Identify immediate work goal
5 Develop career plan

DUTY D: Demonstrating Appropriate Work Behavior

SKILLS:
1 Exhibit dependability
2 Demonstrate punctuality
3 Follow rules and regulations
4 Recognize the consequences of dishonesty
5 Complete assignments in accurate and timely manner
6 Control emotions
7 Assume responsibility for own decisions and actions
8 Exhibit pride and loyalty
9 Exhibit ability to handle pressures and tensions
10 Demonstrate ability to set priorities
11 Demonstrate problem-solving skills

DUTY E: Maintaining Safe and Healthy Environment

SKILLS:
1 Comply with safety and health rules
2 Select correct tools and equipment
3 Utilize equipment correctly

4 Use appropriate action during emergencies
5 Maintain clean and orderly work area
6 Demonstrate personal hygiene and cleanliness

DUTY F: Maintaining Business-Like Image

SKILLS: 1 Participate in company or agency orientation
2 Demonstrate knowledge of company or agency products and services
3 Exhibit positive behavior
4 Read current job-related publications
5 Support and promote employer's company image and purpose
6 Maintain appearance to comply with company standards

DUTY G: Maintaining Working Relationships with Others

SKILLS: 1 Work productively with others
2 Show empathy, respect and support for others
3 Demonstrate procedures and assist others when necessary
4 Recognize, analyze and solve or refer problems
5 Minimize occurrence of problems
6 Channel emotional reaction constructively

DUTY H: Communicating on the Job

SKILLS: 1 Read and comprehend written communications and information
2 Use correct grammar
3 Speak effectively with others
4 Use job-related terminology
5 Listen attentively
6 Write legibly
7 Use telephone etiquette
8 Follow written and oral directions
9 Ask questions
10 Locate information in order to accomplish task
11 Prepare written communication
12 Utilize keyboarding skills
13 Utilize computer skills

DUTY I: Adapting to Change

SKILLS: 1 Recognize need to change
2 Demonstrate willingness to learn
3 Demonstrate flexibility
4 Participate in continuing education
5 Seek work challenges
6 Adjust career goals/plan as needed

DUTY J: Understanding How a Business Works

SKILLS:
1 Recognize the role of business in the enterprise system
2 Identify general responsibilities of employees
3 Identify general responsibilities of management/employers
4 Investigate opportunities and options for business ownership
5 Identify planning processes needed to open a business
6 Participate in meetings

DUTY K: Performing Mathematical Skills

SKILLS:
1 Apply mathematics for problem solving
2 Add and subtract whole numbers, decimals and fractions
3 Multiply and divide whole numbers, decimals and fractions
4 Convert numbers between forms expressed as fractions, decimals and percents
5 Convert between standard American units of measure
6 Convert between standard American units and metric units

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

BRICKLAYER

Duty A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident reports
4 Inspect workplaces for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committees
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation techniques
11 Participate in safety training programs
12 Evaluate personnel safety violations

Duty B: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Coordinate workers with work to be done
4 Schedule and control shop flow of jobs
5 Maintain files
6 Maintain service records
7 Maintain labor records
8 Maintain warranty records
9 Explain work requirements
10 Inventory supplies and equipment
11 Maintain charts, tables, graphs or status boards on work scheduled
12 Check job/time cards
13 Inspect shop equipment and arrange for maintenance and repair work
14 Follow up employee reports of problems or equipment failures
15 Draft correspondence
16 Inspect quality of brickwork
17 Order masonry supplies and equipment
18 Orient new employees
19 Prepare bids for contract masonry work
20 Prepare masonry budgets
21 Prepare estimate of brickwork
22 Compute average cost rates for work performed
23 Determine actual costs of work completed
24 Write work schedules
25 Write technical reports
26 Plan and implement technical training for employees
27 Evaluate employee progress and performance
28 Interview job applicants
29 Hire workers
30 Fire workers
31 Conduct meetings

Duty C: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Clean and maintain work area and leave in safe condition
2 Follow tool crib procedures
3 Report problems to supervisor
4 Complete time cards
5 Complete job status reports
6 Make equipment failure reports
7 Determine basic maintenance procedures using manuals
8 Plan sequence of work operations
9 Use technical references
10 Participate in a participative management program (Quality Circles)

Duty D: Conducting Shop Operations

TASKS:
1 Answer customer questions
2 Troubleshoot customer problems
3 Perform public relations activities
4 Maintain records of service tools and equipment
5 Unpack and inspect new equipment
6 Receive and store parts and supplies
7 Update parts catalogs
8 Make out material lists used on each job
9 Complete work orders

Duty E: Estimating Materials

TASKS:
1 Estimate forming materials
2 Estimate concrete
3 Estimate concrete blocks
4 Estimate rough framing materials
5 Estimate cost of jobs

Duty F: Preparing Building Site

TASKS:
1 Establish elevation reference points from bench mark
2 Establish footing grades
3 Locate and square corners
4 Install batter boards
5 Set grade stakes
6 Lay out buildings using transit

Duty G: Preparing Foundations and Footings

TASKS:
1 Build footings
2 Build forms for concrete
3 Construct piers
4 Construct walls containing pilasters
5 Raise foundations
6 Waterproof foundations
7 Construct stud and sheathing wall forms

8 Erect plywood panel wall forms
9 Erect manufactured wall forms
10 Construct stair forms
11 Strip forms
12 Install beams
13 Install anchor bolts in concrete
14 Install anchor bolts in concrete blocks
15 Install bulkheads
16 Install keyway for footings and foundations

Duty H: Laying, Jointing and Pointing Brick

TASKS:
1 Bond walls
2 Build Gothic archs
3 Build jack archs
4 Build Roman archs
5 Build segmental archs
6 Build soldier archs
7 Build Tudor archs
8 Build corner brick columns
9 Build rectangular brick columns
10 Build round brick columns
11 Build square brick columns
12 Clean brick walls
13 Construct brick veneer walls
14 Construct cavity walls
15 Cut bat closures
16 Cut queen closures
17 Form corbels
18 Gage masonry walls with mortar scale
19 Gage masonry walls with story pole
20 Lay basket weave patterns
21 Lay common bond patterns
22 Lay diamond patterns
23 Lay Dutch bond patterns
24 Lay Flemish bond patterns
25 Lay header courses
26 Lay herringbone bond patterns
27 Lay rowlock courses
28 Lay sailor courses
29 Lay shiner courses
30 Lay soldier courses
31 Lay stack bond patterns
32 Lay stretcher courses
33 Lay American bond patterns
34 Lay English bond patterns
35 Lay fine bricks with clay
36 Tool concave joints
37 Tool convex joints
38 Lay corners
39 Tool rake joints
40 Tool squeeze joints
41 Tool V joints
42 Mix cement mortar
43 Mix mortar by hand

44 Mix mortar with power mixer
45 Point walls
46 Reinforce brick masonry
47 Tie doors to walls using anchors
48 Tie walls together using anchors
49 Cut bricks using masonry saw
50 Cut bricks using partner saw
51 Cut brick blocks using brick hammer
52 Cut brick blocks using brick set
53 Figure pitch using framing square
54 Figure runs of rakes using framing square
55 Mix slack lime mortar

Duty I: Constructing Residential Chimneys and Fireplaces

TASKS:
1 Build double face chimneys
2 Build single face chimneys
3 Cut flue linings
4 Install ash dumps
5 Install clean-out doors
6 Insert dampers
7 Install heatilators
8 Lay hearths
9 Lay mantels
10 Lay throats
11 Lay backs of fireplaces
12 Lay bottoms of fireplaces
13 Lay sides of fireplaces
14 Set flues
15 Install log lighters

Duty J: Constructing Masonry Buildings

TASKS:
1 Build partitions
2 Construct jambs
3 Construct sills
4 Damp proof walls
5 Install wall ties
6 Lay flight of steps
7 Make reinforced lintels
8 Place beams
9 Set door frames
10 Set lintels
11 Set windows

Duty K: Constructing Concrete Masonry

TASKS:
1 Lay concrete blocks
2 Lay running bond patterns in concrete masonry
3 Lay vertical bond patterns in concrete masonry
4 Pour concrete
5 Screed concrete
6 Finish concrete

Duty L: Performing Miscellaneous Masonry Work

TASKS:
1 Construct manholes
2 Construct planters
3 Construct water fountains
4 Fireproof beams
5 Fireproof walls
6 Install flashing
7 Lay glass blocks
8 Lay masonry driveways
9 Lay masonry floors
10 Lay masonry walks
11 Lay ornamental lattice pattern walls
12 Lay structural clay tiles
13 Repair masonry work
14 Set stones
15 Set precast panels
16 Anchor precast panels by welding, bolting or clamping

Duty M: Using Climbing Equipment

TASKS:
1 Inspect climbing equipment for safety
2 Set up ladders
3 Set up ladder jacks and planks
4 Construct outrigger scaffolds
5 Erect metal scaffolds
6 Construct hanging and swinging scaffolds
7 Erect suspended work platforms
8 Set up mobile and powered scaffolds
9 Construct single-pole scaffolds
10 Construct double-pole scaffolds

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

CARPENTER

Duty A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident reports
4 Inspect workplaces for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committees
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation techniques
11 Participate in safety training programs
12 Evaluate personnel safety violations

Duty B: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Coordinate workers with work to be done
4 Schedule and control shop flow of jobs
5 Maintain files
6 Maintain service records
7 Maintain labor records
8 Maintain warranty records
9 Explain work requirements
10 Inventory supplies and equipment
11 Maintain charts, tables, graphs or status boards on work scheduled
12 Check job/time cards
13 Inspect shop equipment and arrange for maintenance and repair work
14 Follow up employee reports of problems or equipment failures
15 Draft correspondence
16 Orient new employees
17 Compute average cost rates for work performed
18 Determine actual costs of work completed
19 Write work schedules
20 Write technical reports
21 Plan and implement technical training for employees
22 Evaluate employee progress and performance
23 Interview job applicants
24 Hire workers
25 Fire workers
26 Conduct meetings

Duty C: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Clean and maintain work area and leave in safe condition
2 Follow tool crib procedures
3 Report problems to supervisor

4 Complete time cards
5 Complete job status reports
6 Make equipment failure reports
7 Determine basic maintenance procedures using manuals
8 Plan sequence of work operations
9 Use technical references
10 Participate in a participative management program (Quality Circles)

Duty D: Conducting Shop Operations

TASKS:
1 Answer customer questions
2 Troubleshoot customer problems
3 Perform public relations activities
4 Maintain records of service tools and equipment
5 Unpack and inspect new equipment
6 Receive and store parts and supplies
7 Update parts catalogs
8 Modify wiring diagrams to reflect repair changes
9 Make out material lists used on each job
10 Complete work orders

Duty E: Estimating Materials

TASKS:
1 Estimate forming materials
2 Estimate concrete
3 Estimate concrete blocks
4 Estimate rough framing materials
5 Estimate roofing materials
6 Estimate windows
7 Estimate doors and jambs
8 Estimate interior underlayment
9 Estimate interior panels
10 Estimate stairway materials
11 Estimate closet accessories
12 Estimate acoustical ceiling materials
13 Estimate prefabricated cabinets
14 Estimate materials for built-ins
15 Estimate finish hardware
16 Estimate siding
17 Estimate cost of jobs

Duty F: Preparing Building Site

TASKS:
1 Establish elevation reference points from bench mark
2 Establish footing grades
3 Locate and square corners
4 Install batter boards
5 Set grade stakes
6 Lay out buildings using transit

Duty G: Preparing Foundations and Footings

TASKS:
1 Build footings
2 Build forms for concrete
3 Waterproof foundations
4 Construct stud and sheathing wall forms
5 Erect plywood panel wall forms
6 Erect manufactured wall forms
7 Construct stair forms
8 Strip forms
9 Install beams
10 Install bulkheads
11 Install keyway for footings and foundations

Duty H: Sharpening Tools

TASKS:
1 Sharpen wood chisels
2 Hone plane irons
3 Sharpen circular saw blades
4 Sharpen twist drills
5 Sharpen auger bits

Duty I: Installing Rough Framing

TASKS:
1 Stack lumber
2 Install sill plates
3 Frame walls
4 Align and brace walls
5 Construct plywood box beams
6 Install diagonal wind bracing
7 Frame floor openings
8 Frame door openings
9 Frame window openings
10 Frame roof openings
11 Frame built-up stringers
12 Frame cleated stair stringers
13 Install floor joists
14 Install cross-bridging
15 Install ceiling joists
16 Construct post and beam frames
17 Install steel beams
18 Install lally posts
19 Install backing for hanging fixtures and cabinets
20 Install exterior wall sheathings
21 Install battens
22 Install plyscore sub-floors
23 Install diagonal sub-floors
24 Install underlayment over sub-floors
25 Install metal studs
26 Set metal door frames for masonry construction
27 Set metal window frames for masonry construction
28 Construct roof trusses
29 Install collar beams
30 Install overhang purlins

31 Install rafter support purlins
32 Install ridgeboards
33 Install common rafters
34 Install tail rafters
35 Install cripple jack rafters
36 Install hip rafters
37 Install hip jack rafters
38 Install valley rafters
39 Install valley jack rafters
40 Install gambrel roof rafters
41 Frame dormers without sidewalls
42 Frame dormers with sidewalls
43 Frame roof saddles
44 Frame snub gables
45 Install gable studs
46 Construct intersecting gable roofs
47 Install roof sheathings

Duty J: Installing Roof Components

TASKS:
1 Install roofing felts
2 Install chimney flashs
3 Install valley flashs
4 Install composite strip shingles
5 Install composite shingles on ridge cap
6 Install composite shingles in valley
7 Install composite shingles around roof opening
8 Install shingles over dormers or roof appendages
9 Install roof vents
10 Install ridge vents
11 Install skylights
12 Install wood shingles/shakes
13 Install wood shingles/shakes on ridge cap
14 Install wood shingles/shakes in valley
15 Install wood shingles/shakes around roof opening
16 Install gutters
17 Install downspouts

Duty K: Installing Exterior Finishes

TASKS:
1 Construct box cornice
2 Construct rake cornice
3 Case exterior opening
4 Install wood jamb window units
5 Hang exterior doors
6 Install exterior door jambs
7 Install metal corners for aluminum or vinyl siding
8 Install corner boards for wood siding
9 Install wood fascia
10 Install wood soffit
11 Install aluminum fascia
12 Install aluminum soffit
13 Install prefabricated columns
14 Install garage doors

15 Install metal siding
16 Install vinyl siding
17 Install composition siding
18 Install prefabricated storm doors
19 Install prefabricated storm windows
20 Install drip caps
21 Install bevel siding
22 Install lap siding
23 Install wood shingle siding
24 Install outside corners of wood shingle siding
25 Install panel siding
26 Construct and install wood louvers
27 Install exterior shutters

Duty L: Installing Interior Finishes

TASKS:
1 Install batt insulations
2 Install vapor barriers
3 Install wall panels
4 Assemble prefabricated cabinets
5 Install closet accessories
6 Install interior door jambs
7 Construct built-in cabinets
8 Install shelves
9 Install baseboards
10 Install ceiling molds
11 Hang drywalls
12 Case interior openings
13 Hang interior doors
14 Install prehung split jamb door units
15 Install double-acting doors
16 Install folding (accordian) doors
17 Install sliding doors
18 Install bi-fold doors
19 Install pocket doors
20 Install cylinder locksets
21 Install mortise locksets
22 Install door closers
23 Install door holders
24 Install panic bars
25 Install flush bolts
26 Install door plates
27 Install weatherstripping
28 Install wall cabinets
29 Install base cabinets
30 Install recessed medicine cabinets
31 Install thresholds
32 Install gypsum lathes
33 Install corner beading for lathes
34 Install plaster grounds
35 Install parquet flooring
36 Install plank flooring
37 Install tongue and groove flooring
38 Install suspended T-grid ceiling

39 Install suspended concealed grid ceiling
40 Install tongue and groove ceiling tiles

Duty M: Assembling and Constructing Stairs

TASKS:
1 Install prefabricated stairs
2 Install disappearing stair unit
3 Construct open riser stairs
4 Construct box stairs
5 Install wood newel post, balusters and railings
6 Install metal newel post and railings

Duty N: Using Climbing Equipment

TASKS:
1 Inspect climbing equipment for safety
2 Set up ladders
3 Set up ladder jacks and planks
4 Construct outrigger scaffolds
5 Erect metal scaffolds
6 Construct hanging and swinging scaffolds
7 Erect suspended work platforms
8 Set up mobile and powered scaffolds
9 Construct single-pole scaffolds
10 Construct double-pole scaffolds

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

BUILDING MAINTENANCE WORKER

Duty A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident reports
4 Inspect workplaces for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committees
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation techniques
11 Participate in safety training programs
12 Evaluate personnel safety violations

Duty B: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Coordinate workers with work to be done
4 Schedule and control shop flow of jobs
5 Maintain files
6 Maintain service records
7 Maintain labor records
8 Maintain warranty records
9 Explain work requirements
10 Inventory supplies and equipment
11 Maintain charts, tables, graphs or status boards on work scheduled
12 Check job/time cards
13 Inspect shop equipment and arrange for maintenance and repair work
14 Follow up employee reports of problems or equipment failures
15 Draft correspondence
16 Orient new employees
17 Compute average cost rates for work performed
18 Determine actual costs of work completed
19 Write work schedules
20 Write technical reports
21 Plan and implement technical training for employees
22 Evaluate employee progress and performance
23 Interview job applicants
24 Hire workers
25 Fire workers
26 Conduct meetings

Duty C: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Clean and maintain work area and leave in safe condition

2 Follow tool crib procedures
3 Report problems to supervisor
4 Complete time cards
5 Complete job status reports
6 Make equipment failure reports
7 Determine basic maintenance procedures using manuals
8 Plan sequence of work operations
9 Use technical references
10 Participate in a participative management program (Quality Circles)

Duty D: Conducting Shop Operations

TASKS:
1 Answer customer questions
2 Troubleshoot customer problems
3 Perform public relations activities
4 Maintain records of service tools and equipment
5 Unpack and inspect new equipment
6 Receive and store parts and supplies
7 Update parts catalogs
8 Modify wiring diagrams to reflect repair changes
9 Make out material lists used on each job
10 Complete work orders

Duty E: Estimating Materials

TASKS:
1 Estimate forming materials
2 Estimate concrete
3 Estimate concrete blocks
4 Estimate rough framing materials
5 Estimate roofing materials
6 Estimate windows
7 Estimate doors and jambs
8 Estimate interior panels
9 Estimate stairway materials
10 Estimate closet accessories
11 Estimate acoustical ceiling materials
12 Estimate prefabricated cabinets
13 Estimate materials for built-ins
14 Estimate finish hardware
15 Estimate siding
16 Estimate cost of jobs

Duty F: Laying, Jointing and Pointing Brick

TASKS:
1 Clean brick walls
2 Construct brick veneer walls
3 Tool rake joints
4 Tool squeeze joints
5 Tool V joints
6 Mix cement mortar
7 Mix mortar by hand
8 Mix mortar with power mixer

9 Point walls
10 Reinforce brick masonry
11 Tie doors to walls using anchors
12 Tie walls together using anchors
13 Cut bricks using masonry saw
14 Cut bricks using partner saw
15 Cut brick blocks using brick hammer
16 Cut brick blocks using brick set
17 Figure pitch using framing square
18 Figure runs of rakes using framing square
19 Mix slack lime mortar

Duty G: Constructing Masonry Buildings

TASKS: 1 Build partitions
2 Construct jambs
3 Construct sills
4 Damp proof walls
5 Install wall ties
6 Set door frames
7 Set lintels
8 Set windows

Duty H: Constructing Concrete Masonry

TASKS: 1 Lay concrete blocks
2 Pour concrete
3 Screed concrete
4 Finish concrete

Duty I: Performing Miscellaneous Masonry Work

TASKS: 1 Construct planters
2 Construct water fountains
3 Fireproof beams
4 Fireproof walls
5 Install flashing
6 Lay glass blocks
7 Lay masonry floors
8 Lay masonry walks
9 Repair masonry work
10 Set stones

Duty J: Sharpening Tools

TASKS: 1 Sharpen wood chisels
2 Hone plane irons
3 Sharpen circular saw blades
4 Sharpen twist drills
5 Sharpen auger bits

Duty K: Installing Rough Framing

TASKS:
1 Install sill plates
2 Install backing for hanging fixtures and cabinets
3 Install plyscore sub-floors
4 Install diagonal sub-floors
5 Install underlayment over sub-floors
6 Set metal door frames for masonry construction
7 Set metal window frames for masonry construction
8 Install roof sheathings

Duty L: Installing Roof Components

TASKS:
1 Install roofing felts
2 Install chimney flashs
3 Install valley flashs
4 Install composite strip shingles
5 Install composite shingles on ridge cap
6 Install composite shingles in valley
7 Install composite shingles around roof opening
8 Install shingles over dormers or roof appendages
9 Install roof vents
10 Install ridge vents
11 Install skylights
12 Install wood shingles/shakes
13 Install wood shingles/shakes on ridge cap
14 Install wood shingles/shakes in valley
15 Install wood shingles/shakes around roof opening
16 Install gutters
17 Install downspouts

Duty M: Installing Exterior Finishes

TASKS:
1 Install wood jamb window units
2 Hang exterior doors
3 Install exterior door jambs
4 Install metal corners for aluminum or vinyl siding
5 Install corner boards for wood siding
6 Install wood fascia
7 Install wood soffit
8 Install aluminum fascia
9 Install aluminum soffit
10 Install prefabricated columns
11 Install garage doors
12 Install metal siding
13 Install vinyl siding
14 Install composition siding
15 Install prefabricated storm doors
16 Install prefabricated storm windows
17 Install drip caps
18 Install bevel siding
19 Install lap siding
20 Install wood shingle siding

21 Install outside corners of wood shingle siding
22 Install panel siding
23 Construct and install wood louvers
24 Install exterior shutters

Duty N: Installing Interior Finishes

TASKS:
1 Install batt insulations
2 Install vapor barriers
3 Install wall panels
4 Assemble prefabricated cabinets
5 Install closet accessories
6 Install interior door jambs
7 Construct built-in cabinets
8 Install shelves
9 Install baseboards
10 Install ceiling molds
11 Hang drywalls
12 Case interior openings
13 Hang interior doors
14 Install prehung split jamb door units
15 Install double-acting doors
16 Install folding (accordian) doors
17 Install sliding doors
18 Install bi-fold doors
19 Install pocket doors
20 Install cylinder locksets
21 Install mortise locksets
22 Install door closers
23 Install door holders
24 Install panic bars
25 Install flush bolts
26 Install door plates
27 Install weatherstripping
28 Install wall cabinets
29 Install base cabinets
30 Install recessed medicine cabinets
31 Install thresholds
32 Install gypsum lathes
33 Install corner beading for lathes
34 Install plaster grounds
35 Install parquet flooring
36 Install plank flooring
37 Install tongue and groove flooring
38 Install suspended T-grid ceiling
39 Install suspended concealed grid ceiling
40 Install tongue and groove ceiling tiles

Duty O: Assembling and Constructing Stairs

TASKS:
1 Install prefabricated stairs
2 Install disappearing stair unit
3 Construct open riser stairs
4 Construct box stairs

5 Install wood newel post, balusters and railings
6 Install metal newel post and railings

Duty P: Selecting Electrical Materials and Determining Work to be Done

TASKS:
1 Locate and lay out devices for job from a blueprint or schematic diagram
2 Figure materials list from blueprint or schematic diagram
3 Determine governing codes
4 Determine type and size for splice and device boxes and covers
5 Select type and size of wires
6 Select mounting devices
7 Select receptacles
8 Select connectors
9 Determine physical protection of conductors

Duty Q: Computing Service Loads

TASKS:
1 Balance the total load per phase
2 Calculate individual circuit loads
3 Calculate load in watts and load current in amps for entire job
4 Determine number of outlets per circuit
5 Determine ground fault circuits
6 Determine location of inside panels and boxes

Duty R: Installing Electrical Environmental Control Components

TASKS:
1 Install baseboard heat units
2 Connect ceiling heating cables to thermostat
3 Connect central electric heaters
4 Connect furnace motors
5 Connect line voltage thermostats
6 Connect low voltage thermostats
7 Install wall heaters
8 Install ceiling heating cables
9 Install furnace motors
10 Install individual space heaters
11 Install vent fans
12 Install air conditioning units

Duty S: Installing Lighting Fixtures

TASKS:
1 Install flood lights
2 Install incandescent lighting fixture dimmers
3 Install fluorescent lighting fixture dimmers
4 Install light fixtures
5 Install photo-electric controls on light
6 Install post lights
7 Install power failure lighting

8 Install moisture resistant fixtures
9 Install appliance pilot lights
10 Install fan controlled by switch
11 Install 110 volt light fixtures
12 Select and install lighting control devices
13 Connect incandescent lighting fixtures
14 Connect fluorescent lighting fixtures
15 Install single pole light circuits with 3-way switches
16 Install single pole light circuits with 4-way switches

Duty T: Installing Switch Boxes and Outlet Boxes

TASKS:
1 Install flush mount switches and outlet boxes in drywall
2 Install flush mount switches and outlet boxes in lath and plaster wall
3 Install flush mount switches and outlet boxes in paneled wall
4 Install flush mount switches and outlet boxes in masonry wall
5 Install gangable boxes
6 Install octagon outlet boxes
7 Install receptacles and switches in existing wall
8 Install recessed fixture housings in ceiling
9 Install surface mount junction boxes

Duty U: Maintaining Existing Wiring

TASKS:
1 Repair fluorescent fixtures
2 Repair lights
3 Repair relays and timers
4 Repair solenoids in door chimes
5 Repair water heaters
6 Repair emergency lighting systems
7 Repair frayed service cords
8 Repair power failure lighting systems
9 Replace cables
10 Replace circuit breakers
11 Replace existing receptacles and switches
12 Replace float switches
13 Replace thermostats
14 Replace fuses
15 Replace appliance pilot light bulbs
16 Test circuits for correct voltage
17 Troubleshoot branch circuits
18 Determine electrical problems using available troubleshooting techniques
19 Interpret control diagrams for electrical systems
20 Diagnose malfunctions of electrical systems using available test and measurement equipment
21 Measure and bend conduits
22 Pull conductors through existing structures
23 Test apparatus for operation
24 Adjust apparatus and devices to specifications

25 Test installations for mechanical integrities
26 Replace circuit breakers
27 Check for overloaded circuits
28 Wire parallel circuits
29 Wire series circuits
30 Wire series-parallel circuits

Duty V: Roughing in Feeders, Branch Circuit Cables and Circuits

TASKS:
1 Rough in cables for branch circuits
2 Rough in conduits for branch circuits
3 Rough in circuit for door chime system
4 Rough in circuit for an intercom system
5 Rough in line-voltage thermostat wiring
6 Rough in low-voltage thermostat wiring
7 Rough in non-metallic cable in outlet boxes
8 Install receptacles with two three-way switches controlling one half of two receptacles
9 Make joints using crimp type connectors
10 Make pigtail splices
11 Make splices using mechanical-type connectors
12 Make fixture splices

Duty W: Trimming out Electrical Devices and Appliances

TASKS:
1 Install automatic garage door openers
2 Connect door chime systems
3 Connect duplex receptacles
4 Install emergency warning systems (burglar or fire - state license only)
5 Install hot water heaters
6 Connect intercom systems
7 Connect low-voltage lighting controls
8 Install photo-electric cell controls
9 Connect recessed fixture boxes in ceiling
10 Connect single pole switches
11 Install single pole switches with pilot light
12 Connect split circuit duplex receptacles
13 Install timer or delayed action switches
14 Connect wires from junction boxes to appliances
15 Install three-way switches
16 Install four-way switches
17 Install surface raceways

Duty X: Installing and Maintaining Motors

TASKS:
1 Install split-phase motors
2 Maintain split-phase motors
3 Install capacitor start motors
4 Maintain capacitor start motors
5 Reverse the rotation of motors
6 Install motor controls
7 Maintain motor controls

8 Change motors for running voltage
9 Replace blower motors

Duty Y: Using Climbing Equipment

TASKS:
1 Inspect climbing equipment for safety
2 Set up ladders
3 Set up ladder jacks and planks
4 Construct outrigger scaffolds
5 Erect metal scaffolds
6 Construct hanging and swinging scaffolds
7 Erect suspended work platforms
8 Set up mobile and powered scaffolds
9 Construct single-pole scaffolds
10 Construct double-pole scaffolds

Duty Z: Preparing Surface for Finishing

TASKS:
1 Prepare surfaces for painting
2 Prepare surfaces for papering
3 Prepare wood surfaces for finishing
4 Prepare concrete surfaces for finishing
5 Prepare metal surfaces for finishing
6 Prepare gypsum surfaces for finishing
7 Prepare plaster surfaces for finishing

Duty AA: Using Compressor and Spray Equipment

TASKS:
1 Lubricate compressors
2 Adjust air regulators
3 Select and use air and fluid hoses
4 Apply paint with conventional spray gun
5 Apply paint with airless spray gun
6 Select and use respirators
7 Clean spray equipment

Duty BB: Finishing Surfaces

TASKS:
1 Mix primer
2 Mix paint to desired color
3 Clean surfaces using paint removal tools and sandpaper
4 Fill holes and cracks
5 Apply primer to surface to be painted
6 Paint plaster or wall surfaces
7 Paint concrete surfaces
8 Paint metal surfaces
9 Seal uncoated wood surfaces
10 Paint uncoated wood surfaces
11 Stain uncoated wood surfaces
12 Apply varnish to wood surfaces
13 Apply shellac to wood surfaces

14 Apply lacquer to wood surfaces
15 Clean area and equipment of finishing materials

Duty CC: Covering Walls:

TASKS: 1 Estimate amount of wallpaper needed
2 Cut wallpaper
3 Prepare wall surfaces for wallpaper
4 Apply wallpaper to walls

Duty DD: Maintaining Structures

TASKS: 1 Inspect structures for soundness
2 Repair cracks
3 Repair alligatoring
4 Repair checking
5 Repair blistering
6 Repair peeling
7 Repair flaking
8 Remove mildew
9 Repair nail head stains
10 Repair peeling and flaking on metal gutters
11 Repair flaking and chaulking masonry
12 Apply protective wall coverings below grade
13 Repaint walls and ceilings
14 Remove and hang new wall coverings
15 Refinish woodwork
16 Refinish concrete
17 Refinish metal

Duty EE: Joining Pipe

TASKS: 1 Bend copper tubing with spring bender
2 Braze pipes with gas torch and filler metal
3 Cut copper tubing and pipes with hacksaw
4 Cut copper tubing and pipes with tubing cutter
5 Cut steel pipes with 4-wheel pipe cutter
6 Cut steel pipes with one-wheel cutter
7 Join copper tubing to brass pipes
8 Join copper tubing/pipes to copper pipe/tubing
9 Join copper tubing/pipes to plastic pipes, using sweat method
10 Join copper tubing to steel pipes
11 Join copper tubing with compressed connectors
12 Join pipe with no-hub or band clamp couplings
13 Join plastic pipes to cast-iron pipes with no-hub couplings
14 Join plastic pipes using solvent cement method
15 Join plastic pipes to steel pipe
16 Thread steel pipes with adjustable dies
17 Thread steel pipes with non-adjustable dies
18 Thread steel pipes with power-driven vise stands

19 Join pipes with electric arc welders and filler metals
20 Weld pipes with oxyacetylene torches and filler materials

Duty FF: Installing Hangars and Supports

TASKS:
1 Install pipe sleeves or thimbles through walls, floors, or ceilings
2 Secure horizontal and vertical lines of pipe to masonry surfaces with hangers
3 Secure horizontal and vertical lines of pipe to metal surfaces with hangers
4 Secure horizontal and vertical lines of pipe to wood surfaces with hangars

Duty GG: Building Water Distribution Lines

TASKS:
1 Install cut-off valves
2 Install cut-off valves in stop-and-waste box
3 Install expansion joints
4 Install hot or cold water storage tanks
5 Install pressure relief valves
6 Install water circulating pumps
7 Insulate water lines
8 Make water pressure tests on water supply systems
9 Rough-in water supply lines for bathtubs
10 Rough-in water supply lines for wall-mounted urinals
11 Rough-in water supply lines for water closets
12 Rough-in water supply lines for water heaters

Duty HH: Building Drains

TASKS:
1 Install cleanouts on drains
2 Make water tests on building drains
3 Rough-in waste lines and vents for bathtubs
4 Rough-in waste lines and vents for built-in lavatories
5 Rough-in waste lines and vents for dishwashers
6 Rough-in waste lines and vents for floor-mounted water closets
7 Rough-in waste lines for shower baths
8 Rough-in waste lines for wall-mounted urinals

Duty II: Installing Traps and Cleanouts

TASKS:
1 Install acid-proof traps
2 Install garbage disposal units
3 Install grease interceptors in waste lines
4 Install waste sinks for food-handling equipment

Duty JJ: Installing Vents

TASKS:
1 Install soil or waste back vents
2 Install vent terminals (roof-flashing)

Duty KK: Installing Fixtures

TASKS:
1 Install built-in lavatories
2 Install dishwashers
3 Install drinking fountains
4 Install electric water heaters
5 Install flush valve-type water closets
6 Install gas water heaters
7 Install washing machines
8 Install shower bath accessories in ceramic tile baths
9 Install tank-type water closets
10 Install bathtubs
11 Install wall-mounted lavatories
12 Install wall-mounted urinals

Duty LL: Installing/Maintaining Hydronic Heating Systems

TASKS:
1 Install expansion tanks
2 Install finn tube radiation
3 Install cast iron baseboard radiation
4 Install circulating pumps
5 Select and install valves for heating system
6 Replace relief valves
7 Repair circulating pumps
8 Troubleshoot control system for hot water boilers
9 Troubleshoot control system for steam boilers
10 Check for improper combustions
11 Repair leak in radiant floor coil systems
12 Clean and adjust gas burners
13 Check steam pressures for boiler malfunctions
14 Clean deposits from boilers

Duty MM: Maintaining Plumbing Systems

TASKS:
1 Clear obstructions from lavatory drains
2 Remove obstructions from main drain lines
3 Remove obstructions from water closet drains
4 Replace lavatory trap drains
5 Repair leaking shower valves
6 Repair leaking water faucets or valves
7 Repair water flush valves on water closets
8 Clean steam pressure regulator valves
9 Replace pressure control switches on water pumps
10 Replace section of galvanized water supply lines
11 Inspect fuel tank liners
12 Replace fuel tank liners

Duty NN: Maintaining the Outside Environment

TASKS:
1 Mow lawns
2 Prune trees and shrubs
3 Clean drives and walks of snow
4 Water lawns
5 Water inside plants
6 Seed lawns
7 Lay sod
8 Control tree and shrub diseases
9 Control tree and shrub insects
10 Control lawn diseases
11 Control lawn insects
12 Control lawn weeds
13 Plant trees and shrubs
14 Fertilize lawns
15 Rake and sweep lawns
16 Aerate lawns

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

ELECTRICIAN

Duty A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident reports
4 Inspect workplaces for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committees
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation techniques
11 Participate in safety training programs
12 Evaluate personnel safety violations

Duty B: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Coordinate workers with work to be done
4 Schedule and control shop flow of jobs
5 Maintain files
6 Maintain service records
7 Maintain labor records
8 Maintain warranty records
9 Explain work requirements
10 Inventory supplies and equipment
11 Maintain charts, tables, graphs or status boards on work scheduled
12 Check job/time cards
13 Inspect shop equipment and arrange for maintenance and repair work
14 Follow up employee reports of problems or equipment failures
15 Draft correspondence
16 Orient new employees
17 Compute average cost rates for work performed
18 Determine actual costs of work completed
19 Write work schedules
20 Write technical reports
21 Plan and implement technical training for employees
22 Evaluate employee progress and performance
23 Interview job applicants
24 Hire workers
25 Fire workers
26 Conduct meetings

Duty C: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Clean and maintain work area and leave in safe condition

2 Follow tool crib procedures
3 Report problems to supervisor
4 Complete time cards
5 Complete job status reports
6 Make equipment failure reports
7 Determine basic maintenance procedures using manuals
8 Plan sequence of work operations
9 Use technical references
10 Participate in a participative management program (Quality Circles)

Duty D: Conducting Shop Operations

TASKS: 1 Answer customer questions
2 Troubleshoot customer problems
3 Perform public relations activities
4 Maintain records of service tools and equipment
5 Unpack and inspect new equipment
6 Receive and store parts and supplies
7 Update parts catalogs
8 Modify wiring diagrams to reflect repair changes
9 Make out material lists used on each job
10 Complete work orders

Duty E: Estimating Materials

TASKS: 1 Estimate cost of jobs

Duty F: Selecting Electrical Materials and Determining Work to be Done

TASKS: 1 Locate and lay out devices for job from a blueprint or schematic diagram
2 Figure materials list from blueprint or schematic diagram
3 Determine governing codes
4 Determine type and size for splice and device boxes and covers
5 Select location of inside panels and boxes
6 Select type and size of wires
7 Select mounting devices
8 Select equipment disconnects
9 Determine panelboards
10 Select ground fault protections
11 Select service entrance
12 Select receptacles
13 Select connectors
14 Determine electrical insulations
15 Determine physical protection of conductors

Duty G: Computing Service Loads

TASKS: 1 Balance the total load per phase

2 Calculate individual circuit loads
3 Calculate load in watts and load current in amps for entire job
4 Compute size of service entrance conductors
5 Design electrical systems
6 Determine number of outlets per circuit
7 Determine ground fault circuits
8 Determine cost and practicality of underground or overhead service
9 Determine location of inside panels and boxes

Duty H: Installing Electrical Environmental Control Components

TASKS:
1 Install baseboard heat units
2 Connect ceiling heating cables to thermostat
3 Connect central electric heaters
4 Connect furnace motors
5 Connect line voltage thermostats
6 Connect low voltage thermostats
7 Install wall heaters
8 Connect wiring for boiler control system
9 Install ceiling heating cables
10 Install central electric heaters
11 Install furnace motors
12 Install individual space heaters
13 Install vent fans
14 Install air conditioning units
15 Install electrical environmental control systems

Duty I: Installing Lighting Fixtures

TASKS:
1 Install flood lights
2 Install incandescent lighting fixture dimmers
3 Install fluorescent lighting fixture dimmers
4 Install heat-a-vent lights
5 Install light fixtures
6 Install photo-electric controls on light
7 Install post lights
8 Install power failure lighting
9 Install delayed lighting switches
10 Install low-voltage lighting controls
11 Install moisture resistant fixtures
12 Install appliance pilot lights
13 Install fan controlled by switch
14 Install 110 volt light fixtures
15 Select and install lighting control devices
16 Connect incandescent lighting fixtures
17 Connect fluorescent lighting fixtures
18 Install single pole light circuits with 3-way switches
19 Install single pole light circuits with 4-way switches
20 Install remote control light circuits

Duty J: Installing Service Entrance

TASKS:
1 Ground service entrance equipment
2 Install circuit breakers in panel
3 Install main service panel
4 Install mast-type service entrance
5 Install main service disconnect
6 Install mobile home service
7 Install service entrance cable to service drop
8 Install temporary service entrance
9 Install underground service entrance

Duty K: Installing Switch Boxes and Outlet Boxes

TASKS:
1 Install bar-hanger mounted boxes
2 Install flush mounted junction boxes
3 Install flush mount switches and outlet boxes in drywall
4 Install flush mount switches and outlet boxes in lath and plaster wall
5 Install flush mount switches and outlet boxes in paneled wall
6 Install flush mount switches and outlet boxes in masonry wall
7 Install gangable boxes
8 Install octagon outlet boxes
9 Install receptacles and switches in existing wall
10 Install recessed fixture housings in ceiling
11 Install surface mount junction boxes
12 Install underground, watertight, cast-iron boxes

Duty L: Maintaining Existing Wiring

TASKS:
1 Repair automatic control systems
2 Repair fire alarm stations (must be state licensed)
3 Repair fluorescent fixtures
4 Repair heating system controls
5 Repair lights
6 Repair relays and timers
7 Repair solenoids in door chimes
8 Repair water heaters
9 Repair emergency lighting systems
10 Repair frayed service cords
11 Repair power failure lighting systems
12 Replace existing interior load centers
13 Replace cables
14 Replace circuit breakers
15 Replace existing receptacles and switches
16 Replace float switches
17 Replace thermostats
18 Replace fuses
19 Replace grounding electrode conductors
20 Replace appliance pilot light bulbs
21 Replace service entrances

22 Replace transformers
23 Test circuits for correct voltage
24 Troubleshoot branch circuits
25 Determine electrical problems using available troubleshooting techniques
26 Interpret control diagrams for electrical systems
27 Diagnose malfunctions of electrical systems using available test and measurement equipment
28 Measure and bend conduits
29 Pull conductors through existing structures
30 Test apparatus for operation
31 Adjust apparatus and devices to specifications
32 Test installations for mechanical integrities
33 Replace circuit breakers
34 Check for overloaded circuits
35 Wire parallel circuits
36 Wire series circuits
37 Wire series-parallel circuits

Duty M: Roughing in Feeders, Branch Circuit Cables and Circuits

TASKS:
1 Rough in 120-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)
2 Rough in 240-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)
3 Rough in armored cables to outlet boxes
4 Rough in cables between existing boxes and new boxes
5 Rough in cables for branch circuits
6 Rough in conduits for branch circuits
7 Install devices controlled by two three-way switches with feed to switch box
8 Install devices controlled by two three-way switches with feed to light box
9 Install devices controlled by two three-way switches and one four-way switch with feed to three-way switch
10 Install device controlled by two three-way switches and one four-way switch with feed to light
11 Install device controlled by two three-way switches and two four-way switches with feed to three-way switch
12 Rough in circuit for door chime system
13 Rough in circuit for an intercom system
14 Rough in line-voltage thermostat wiring
15 Rough in low-voltage thermostat wiring
16 Rough in non-metallic cable in outlet boxes
17 Install pressure switches in existing well
18 Install receptacles with two three-way switches controlling one half of two receptacles
19 Install single pole switches controlling one or more devices with feed to switch box
20 Install single pole switches controlling one or more devices with feed to light/device box
21 Install single pole switches controlling three lights or devices with feed to end light box
22 Install split circuit duplex receptacles

23 Install two three-way switches controlling one device using conduit and 4" square boxes with plaster rings-circuitry and boxes
24 Install underground circuits
25 Install underground direct burial cables
26 Make up branch circuit wires to panels
27 Rough in single pole switch circuits
28 Run feeder cable from main service panel to auxiliary panel
29 Make joints using crimp type connectors
30 Make pigtail splices
31 Make splices using mechanical-type connectors
32 Make fixture splices

Duty N: Trimming out Electrical Devices and Appliances

TASKS:
1 Install automatic garage door openers
2 Connect door chime systems
3 Connect duplex receptacles
4 Install electric fence chargers
5 Install emergency warning systems (burglar or fire - state license only)
6 Install three-wire 220 volt receptacles
7 Install four-wire 220 volt receptacles
8 Install ground fault interrupting devices
9 Install hot water heaters
10 Install humidity control devices
11 Connect intercom systems
12 Connect low-voltage lighting controls
13 Install photo-electric cell controls
14 Connect recessed fixture boxes in ceiling
15 Connect single pole switches
16 Install single pole switches with pilot light
17 Connect split circuit duplex receptacles
18 Install timer or delayed action switches
19 Connect water pump motors
20 Connect wires from junction boxes to appliances
21 Install three-way switches
22 Install four-way switches
23 Install surface raceways
24 Install water pump motors
25 Connect 120-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)
26 Connect 240-volt circuits to distribution panel using non-metallic sheathed cable (N.M.C.)

Duty O: Installing and Maintaining Motors

TASKS:
1 Install split-phase motors
2 Maintain split-phase motors
3 Install capacitor start motors
4 Maintain capacitor start motors
5 Reverse the rotation of motors
6 Install motor controls

7 Maintain motor controls
8 Change motors for running voltage
9 Replace blower motors
10 Replace furnace motors
11 Replace pump motors for well
12 Service electric motors

Duty P: Using Climbing Equipment

TASKS: 1 Inspect climbing equipment for safety
2 Set up ladders

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

MAINTENANCE PAINTER

Duty A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident reports
4 Inspect workplaces for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committees
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation techniques
11 Participate in safety training programs
12 Evaluate personnel safety violations

Duty B: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Coordinate workers with work to be done
4 Schedule and control shop flow of jobs
5 Maintain files
6 Maintain service records
7 Maintain labor records
8 Maintain warranty records
9 Explain work requirements
10 Inventory supplies and equipment
11 Maintain charts, tables, graphs or status boards on work scheduled
12 Check job/time cards
13 Inspect shop equipment and arrange for maintenance and repair work
14 Follow up employee reports of problems or equipment failures
15 Draft correspondence
16 Orient new employees
17 Compute average cost rates for work performed
18 Determine actual costs of work completed
19 Write work schedules
20 Write technical reports
21 Plan and implement technical training for employees
22 Evaluate employee progress and performance
23 Interview job applicants
24 Hire workers
25 Fire workers
26 Conduct meetings

Duty C: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Clean and maintain work area and leave in safe condition
2 Follow tool crib procedures
3 Report problems to supervisor

4 Complete time cards
5 Complete job status reports
6 Make equipment failure reports
7 Determine basic maintenance procedures using manuals
8 Plan sequence of work operations
9 Use technical references
10 Participate in a participative management program (Quality Circles)

Duty D: Conducting Shop Operations

TASKS: 1 Answer customer questions
2 Troubleshoot customer problems
3 Perform public relations activities
4 Maintain records of service tools and equipment
5 Unpack and inspect new equipment
6 Receive and store parts and supplies
7 Update parts catalogs
8 Make out material lists used on each job
9 Complete work orders

Duty E: Estimating Materials

TASKS: 1 Estimate cost of jobs

Duty F: Using Climbing Equipment

TASKS: 1 Inspect climbing equipment for safety
2 Set up ladders
3 Set up ladder jacks and planks
4 Construct outrigger scaffolds
5 Erect metal scaffolds
6 Construct hanging and swinging scaffolds
7 Erect suspended work platforms
8 Set up Bosun's chairs
9 Set up mobile and powered scaffolds
10 Construct single-pole scaffolds
11 Construct double-pole scaffolds

Duty G: Preparing Surface for Finishing

TASKS: 1 Prepare surfaces for painting
2 Prepare surfaces for papering
3 Prepare wood surfaces for finishing
4 Prepare concrete surfaces for finishing
5 Prepare metal surfaces for finishing
6 Prepare gypsum surfaces for finishing
7 Prepare plaster surfaces for finishing

Duty H: Using Compressor and Spray Equipment

TASKS:
1 Lubricate compressors
2 Adjust air regulators
3 Select and use air and fluid hoses
4 Apply paint with conventional spray gun
5 Apply paint with airless spray gun
6 Select and use respirators
7 Clean spray equipment

Duty I: Finishing Surfaces

TASKS:
1 Mix primer
2 Mix paint to desired color
3 Clean surfaces using paint removal tools and sandpaper
4 Fill holes and cracks
5 Apply primer to surface to be painted
6 Paint plaster or wall surfaces
7 Paint concrete surfaces
8 Paint metal surfaces
9 Seal uncoated wood surfaces
10 Paint uncoated wood surfaces
11 Stain uncoated wood surfaces
12 Apply varnish to wood surfaces
13 Apply shellac to wood surfaces
14 Apply lacquer to wood surfaces
15 Clean area and equipment of finishing materials

Duty J: Covering Walls

TASKS:
1 Estimate amount of wallpaper needed
2 Cut wallpaper
3 Prepare wall surfaces for wallpaper
4 Apply wallpaper to walls

Duty K: Maintaining Structures

TASKS:
1 Inspect structures for soundness
2 Repair cracks
3 Repair alligatoring
4 Repair checking
5 Repair blistering
6 Repair peeling
7 Repair flaking
8 Remove mildew
9 Repair nail head stains
10 Repair peeling and flaking on metal gutters
11 Repair flaking and chaulking masonry
12 Apply protective wall coverings below grade
13 Repaint walls and ceilings
14 Remove and hang new wall coverings

15 Refinish woodwork
16 Refinish concrete
17 Refinish metal

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

PLUMBER/PIPEFITTER

Duty A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident reports
4 Inspect workplaces for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committees
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation techniques
11 Participate in safety training programs
12 Evaluate personnel safety violations

Duty B: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Coordinate workers with work to be done
4 Schedule and control shop flow of jobs
5 Maintain files
6 Maintain service records
7 Maintain labor records
8 Maintain warranty records
9 Explain work requirements
10 Inventory supplies and equipment
11 Maintain charts, tables, graphs or status boards on work scheduled
12 Check job/time cards
13 Inspect shop equipment and arrange for maintenance and repair work
14 Follow up employee reports of problems or equipment failures
15 Draft correspondence
16 Orient new employees
17 Compute average cost rates for work performed
18 Determine actual costs of work completed
19 Write work schedules
20 Write technical reports
21 Plan and implement technical training for employees
22 Evaluate employee progress and performance
23 Interview job applicants
24 Hire workers
25 Fire workers
26 Conduct meetings

Duty C: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Clean and maintain work area and leave in safe condition
2 Follow tool crib procedures
3 Report problems to supervisor

4 Complete time cards
5 Complete job status reports
6 Make equipment failure reports
7 Determine basic maintenance procedures using manuals
8 Plan sequence of work operations
9 Use technical references
10 Participate in a participative management program (Quality Circles)

Duty D: Conducting Shop Operations

TASKS:
1 Answer customer questions
2 Troubleshoot customer problems
3 Perform public relations activities
4 Maintain records of service tools and equipment
5 Unpack and inspect new equipment
6 Receive and store parts and supplies
7 Update parts catalogs
8 Make out material lists used on each job
9 Complete work orders

Duty E: Estimating Materials

TASKS:
1 Estimate cost of jobs

Duty F: Using Climbing Equipment

TASKS:
1 Inspect climbing equipment for safety
2 Set up ladders

Duty G: Joining Pipe

TASKS:
1 Bend copper tubing with spring bender
2 Braze pipes with gas torch and filler metal
3 Join cast-iron pipes using lead and oakum
4 Cut cast-iron soil pipes with snap-type chain cutter
5 Cut concrete pipes
6 Cut copper tubing and pipes with hacksaw
7 Cut copper tubing and pipes with tubing cutter
8 Cut steel pipes with 4-wheel pipe cutter
9 Cut steel pipes with one-wheel cutter
10 Join cast-iron pipes to clay pipe
11 Join clay pipes with couplings
12 Join copper tubing to brass pipes
13 Join copper tubing/pipes to copper pipe/tubing
14 Join copper tubing/pipes to plastic pipes, using sweat method
15 Join copper tubing to steel pipes
16 Join copper tubing with compressed connectors
17 Join pipe with no-hub or band clamp couplings
18 Join plastic pipes to cast-iron pipes with no-hub couplings
19 Join plastic pipes using solvent cement method

20 Join plastic pipes to steel pipe
21 Join steel pipes to cast-iron pipes with no-hub couplings
22 Thread steel pipes with adjustable dies
23 Thread steel pipes with non-adjustable dies
24 Thread steel pipes with power-driven vise stands
25 Join pipes with electric arc welders and filler metals
26 Weld pipes with oxyacetylene torches and filler materials

Duty H: Installing Hangars and Supports

TASKS:
1 Install pipe sleeves or thimbles through walls, floors, or ceilings
2 Secure horizontal and vertical lines of pipe to masonry surfaces with hangers
3 Secure horizontal and vertical lines of pipe to metal surfaces with hangers
4 Secure horizontal and vertical lines of pipe to wood surfaces with hangars

Duty I: Building Water Distribution Lines

TASKS:
1 Install booster pumps in water supply lines
2 Install cut-off valves
3 Install cut-off valves in stop-and-waste box
4 Install expansion joints
5 Install hot or cold water storage tanks
6 Repair make-up water components on water cooling towers
7 Install pressure relief valves
8 Install water circulating pumps
9 Insulate water lines
10 Make water pressure tests on water supply systems
11 Rough-in water supply lines for bathtubs
12 Rough-in water supply lines for wall-mounted urinals
13 Rough-in water supply lines for water closets
14 Rough-in water supply lines for water heaters
15 Lay out trench lines

Duty J: Building Drains

TASKS:
1 Backfill trenches
2 Calculate slope required for building sewer lines
3 Install drain pipes in trenches
4 Establish grade lines for installing plumbing
5 Install cleanouts on drains
6 Install float valves on water cooling towers
7 Install overflow pipes on water cooling towers
8 Install storm drains
9 Lay out house drains
10 Make water tests on building drains
11 Rough-in waste lines and vents for bathtubs
12 Rough-in waste lines and vents for built-in lavatories
13 Rough-in waste lines and vents for dishwashers

14 Rough-in waste lines and vents for floor-mounted water closets
15 Rough-in waste lines for shower baths
16 Rough-in waste lines for wall-mounted urinals

Duty K: Installing Traps and Cleanouts

TASKS:
1 Install acid-proof traps
2 Install garbage disposal units
3 Install grease interceptors in waste lines
4 Install waste sinks for food-handling equipment

Duty L: Installing Vents

TASKS:
1 Install soil or waste back vents
2 Install vent terminals (roof-flashing)

Duty M: Installing Fixtures

TASKS:
1 Install built-in lavatories
2 Install dishwashers
3 Install drinking fountains
4 Install electric water heaters
5 Install flush valve-type water closets
6 Install gas water heaters
7 Install washing machines
8 Install shower bath accessories in ceramic tile baths
9 Install tank-type water closets
10 Install bathtubs
11 Install wall-mounted lavatories
12 Install wall-mounted urinals

Duty N: Installing/Maintaining Hydronic Heating Systems

TASKS:
1 Install cast iron sectional boilers
2 Install horizontal steel tube boilers
3 Install expansion tanks
4 Install finn tube radiation
5 Install cast iron baseboard radiation
6 Install circulating pumps
7 Install header and "hartford loops"
8 Select and install valves for heating system
9 Install steam traps
10 Replace relief valves
11 Repair circulating pumps
12 Troubleshoot control system for hot water boilers
13 Troubleshoot control system for steam boilers
14 Check for improper combustions
15 Repair leak in radiant floor coil systems
16 Clean and adjust gas burners
17 Check steam pressures for boiler malfunctions
18 Clean deposits from boilers

Duty O: Maintaining Plumbing Systems

TASKS:
1 Clear obstructions from lavatory drains
2 Remove obstructions from main drain lines
3 Remove obstructions from water closet drains
4 Replace lavatory trap drains
5 Repair leaking shower valves
6 Repair leaking water faucets or valves
7 Repair water flush valves on water closets
8 Clean steam pressure regulator valves
9 Install prefabricated air chambers
10 Replace pressure control switches on water pumps
11 Replace section of galvanized water supply lines
12 Inspect fuel tank liners
13 Replace fuel tank liners

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

Education For Employment Task Lists

Illinois State Board of Education

Adult Vocational and Technical Education

INDUSTRIAL OCCUPATIONS

ELECTRONICS CLUSTER

Computer Repair Technician

Electrical and Electronic Technician

*Employability Skills

*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

NOTE:

The duties and tasks found in these task lists form the basis of instructional content for secondary, postsecondary and adult occupational training programs. Orientation level instruction, usually offered in grades 9, 10, and 11, is a vital component of all vocational education programs and provides a strong foundation and vehicle for transitioning into occupational training programs.

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ELECTRONIC CLUSTER MATRIX

CRT = Computer Repair Technician
EET = Electrical and Electronic Technician

APPLYING SAFETY PRACTICES

	CRT	EET
1 Apply basic emergency first aid techniques	X	X
2 Complete accident report	X	X
3 Inspect work area and equipment for safe working environment	X	X
4 Report shop, environmental and equipment safety violations	X	X
5 Demonstrate use of fire extinguishers	X	X
6 Plan shutdown procedure for given area	X	X
7 Participate in disaster control exercises	X	X
8 Prepare plan for disaster control exercises	X	X
9 Participate in shop safety committee	X	X
10 Organize shop safety committee	X	X
11 Correct safety hazards	X	X
12 Demonstrate cardiopulmonary resuscitation (CPR) techniques	X	X

ANALYZING DC CIRCUITS

	CRT	EET
1 Read and interpret color codes	X	X
2 Analyze, construct and troubleshoot series circuits	X	X
3 Analyze, construct and troubleshoot parallel circuits	X	X
4 Analyze, construct and troubleshoot series-parallel circuits	X	X
5 Analyze, construct and troubleshoot voltage dividers	X	X
6 Analyze, construct and verify maximum power theory	X	X
7 Analyze, construct and troubleshoot resistance x capacitance (RC) and resistance x inductance (RL) circuits	X	X

ANALYZING AC CIRCUITS

	CRT	EET
1 Set up and operate frequency counters and signal generators for AC circuits	X	X
2 Analyze, construct and troubleshoot AC capacitive circuits using a schematic	X	X
3 Analyze, construct and troubleshoot AC inductive circuits using a schematic	X	X
4 Analyze and apply principles of transformers to AC circuits using a schematic	X	X
5 Analyze, construct and troubleshoot resistor, capicitor and inductor (RCL) circuits using a schematic	X	X
6 Analyze, construct and troubleshoot series and parallel resonant circuits using a schematic	X	X
7 Analyze, construct and troubleshoot filter circuits using a schematic	X	X

ANALYZING SOLID STATE DEVICES

	CRT	EET
1 Analyze, construct and troubleshoot simple common base amplifiers using a schematic	X	X
2 Analyze, construct and troubleshoot simple common emitters using a schematic	X	X
3 Analyze, construct and troubleshoot simple common collectors using a schematic	X	X
4 Examine field effect transistor (FET) characteristics	X	X

		CRT	EET
5	Analyze, construct and troubleshoot simple common sources using a schematic	X	X
6	Analyze, construct and troubleshoot simple common drains using a schematic	X	X
7	Analyze, construct and troubleshoot simple common gains using a schematic	X	X
8	Analyze, construct and troubleshoot thyristors using a schematic	X	X
9	Analyze, construct and troubleshoot integrated circuit operational amplifiers using a schematic	X	X
10	Analyze, construct and troubleshoot optoelectronic devices using a schematic	X	X

ANALYZING ANALOG CIRCUITS

		CRT	EET
1	Analyze, construct and troubleshoot single-stage amplifiers using a schematic	X	X
2	Analyze, construct and troubleshoot multistage amplifiers using a schematic	X	X
3	Analyze, construct and troubleshoot basic power supplies, filters and regulators using a schematic	X	X
4	Analyze, construct and troubleshoot differential and operational amplifiers using a schematic	X	X
5	Analyze, construct and troubleshoot active filters using a schematic	X	X
6	Analyze, construct and troubleshoot oscillators using a schematic	X	X
7	Analyze, construct and troubleshoot basic pulse circuits using a schematic	X	X
8	Analyze, construct and troubleshoot basic modulation circuits using a schematic	X	X

ANALYZING DIGITAL ELECTRONIC CIRCUITS

		CRT	EET
1	Analyze and troubleshoot basic digital logic gate integrated circuits using a schematic	X	X
2	Verify basic Boolean expressions using basic logic gates	X	X
3	Analyze, construct and troubleshoot basic encoding and decoding circuits using a schematic	X	X
4	Analyze, construct and troubleshoot flip flops (memory) using a schematic	X	X
5	Analyze, construct and troubleshoot shift registers using a schematic	X	X
6	Analyze, construct and troubleshoot counters using a schematic	X	X
7	Analyze, construct and troubleshoot arithmetic circuits using a schematic	X	X
8	Analyze, construct and troubleshoot basic digital logic systems using a schematic	X	X

PERFORMING MICROPROCESSING OPERATIONS

	CRT	EET
1 Write, enter, verify and run simple machine language programs	X	X
2 Write, enter, verify and run machine language arithmetic programs	X	X
3 Write, enter, verify and run machine language branching programs	X	X
4 Perform basic programming using algorithms	X	X
5 Write, enter, verify and run machine language program using additional addressing modes	X	X
6 Perform basic programming using branching, algorithms and flow charting	X	X
7 Perform basic programming to demonstrate computer arithmetic	X	X
8 Prepare simple program to demonstrate operation of microprocessor unit (MPU) stack, subroutines, input/output (I/O) and interrupts	X	X
9 Prepare simple program to perform interface operations with random access memory (RAM) and display	X	X
10 Prepare simple program to perform interface operations with switches and light emitted diodes (LEO's)	X	X
11 Interface analog to digital converters to microprocessor	X	X
12 Interface digital to analog converters to microprocessor	X	X

PERFORMING LAB PRACTICES

	CRT	EET
1 Assemble printed circuit (PC) board	X	X
2 Solder wires to turret terminals and printed circuit (PC) boards	X	X
3 Assemble and solder printed circuit (PC) board	X	X
4 Repair printed circuit (PC) board	X	X
5 Set up and operate scales	X	X
6 Set up and operate mechanical and optical measuring devices	X	X
7 Set up and operate height gauges	X	X
8 Set up and operate depth gauges	X	X
9 Set up and operate oscilloscopes	X	X
10 Set up and operate multimeter and power supplies	X	X
11 Set up and operate capacitor inductor analyzers	X	X
12 Set up and operate semiconductor testers and curve tracers	X	X
13 Set up and operate chart recorder	X	X
14 Set up and use digital test equipment	X	X

RECORDING AND REPORTING TECHNICAL MATERIAL

	CRT	EET
1 Record data and design curves and graphs	X	X
2 Write reports	X	X
3 Make equipment failure reports	X	X
4 Specify and requisition simple electronic components	X	X
5 Write formal reports of laboratory experiences	X	X

USING TECHNICAL REFERENCES

	CRT	EET
1 Identify manufacturers of various electronic devices using numerical integrated circuit (IC) reference manuals	X	X
2 Identify specific characteristics of various electronic devices using manufacturers' reference manuals	X	X

	CRT	EET
3 Identify distributors of various electronic devices using reference manuals	X	X
4 Cross-reference various electronic devices between manufacturers using reference manuals	X	X
5 Determine maintenance procedures using manuals	X	X

MAINTAINING AND REPAIRING ELECTRICAL SYSTEMS

	CRT	EET
1 Replace faulty electrical cords and plugs	X	X
2 Determine electrical problems using available troubleshooting techniques	X	X
3 Interpret control diagrams for electrical systems	X	X
4 Diagnose malfunctions of electrical systems using available test and measurement equipment	X	X

MAINTAINING AND REPAIRING ELECTRONIC SYSTEMS

	CRT	EET
1 Determine electronic problems using available troubleshooting techniques	X	X
2 Interpret control diagrams for electronic systems	X	X
3 Diagnose malfunctions of electronic systems using available test and measurement equipment	X	X

CONDUCTING SHOP OPERATIONS

	CRT	EET
1 Answer customer questions	X	X
2 Troubleshoot customer problems	X	X
3 Determine repair method	X	X
4 Perform public relations activities	X	X
5 Demonstrate computer equipment functions at store	X	X
6 Demonstrate software functions	X	X
7 Prepare service bill	X	X
8 Maintain accounts receivable/paid records	X	X
9 Maintain receiving records	X	X
10 Maintain shipping records	X	X
11 Maintain records of service tools and equipment	X	X
12 Maintain computer equipment inventory	X	X
13 Maintain call record report	X	X
14 Update on-site maintenance log	X	X
15 Unpack and inspect new equipment	X	X
16 Receive and store parts and supplies	X	X
17 Discuss delivery schedule with approved supplier	X	X
18 Order parts and supplies	X	X
19 Establish customer and equipment history file	X	X
20 Establish customer files	X	X
21 Prepare items for shipping	X	X
22 Update service manuals	X	X
23 Update parts catalogs	X	X
24 Modify wiring diagrams to reflect repair changes	X	X

PERFORMING HOUSEKEEPING AND RECORDKEEPING

	CRT	EET
1 Clean and maintain work area and leave in safe condition	X	X
2 Follow tool crib procedures	X	X
3 Report problems to supervisor	X	X

	CRT	EET
4 Complete time cards	X	X
5 Complete job status reports	X	X
6 Make equipment failure reports	X	X
7 Use manuals to determine basic maintenance procedures	X	X
8 Participate in participation management program (Quality Circles)	X	X

PERFORMING SUPERVISORY FUNCTIONS

	CRT	EET
1 Determine availability of machines, supplies and materials	X	X
2 Requisition, schedule and distribute supplies and materials	X	X
3 Coordinate workers with work to be done	X	X
4 Schedule and control shop flow of jobs	X	X
5 Maintain files	X	X
6 Maintain service records	X	X
7 Maintain labor records	X	X
8 Explain work requirements	X	X
9 Write technical reports	X	X
10 Inventory supplies and equipment	X	X
11 Maintain charts, tables, graphs or status boards on work scheduled	X	X
12 Check job/time cards	X	X
13 Inspect shop equipment and arrange for maintenance and work	X	X
14 Coordinate maintenance and repair of shop equipment	X	X
15 Develop preventative maintenance program	X	X
16 Plan and implement technical training for employees	X	X
17 Train new service technicians	X	X
18 Evaluate employee progress and performance	X	X
19 Follow up employee reports of problems or equipment failures	X	X
20 Interview job applicants	X	X
21 Estimate cost of equipment installation	X	X
22 Estimate cost of system installation	X	X
23 Estimate cost of maintenance repairs and downtime	X	X
24 Conduct representative meetings	X	X

INSTALLING COMPUTER EQUIPMENT

	CRT	EET
1 Determine customer computing requirements	X	
2 Design computer system layout	X	
3 Transport computer equipment	X	
4 Set up computer equipment	X	
5 Perform computer installation tests	X	
6 Demonstrate usage of computer system on-site	X	
7 Complete warranty cards for computer equipment	X	
8 Construct cables for computer equipment	X	

EVALUATING COMPUTER DIAGNOSTICS

	CRT	EET
1 Conduct motherboard random access memory (RAM) test	X	
2 Conduct motherboard read only memory random access (ROM) test	X	
3 Conduct programmers' aid test	X	
4 Conduct computer keyboard test	X	
5 Conduct computer paddle/button test	X	

	CRT	EET
6 Conduct computer tape read/write/verify test	X	
7 Conduct computer color bar test	X	
8 Conduct computer graphic tablet test	X	
9 Conduct basic/integer read only memory (ROM) card test	X	
10 Conduct computer language card test	X	
11 Conduct computer disk interface card test	X	
12 Conduct computer printer card test	X	
13 Conduct computer serial communication card test	X	
14 Conduct computer monitor test	X	
15 Conduct computer oscilloscope test	X	
16 Conduct computer data communication line test	X	
17 Interpret computer diagnostic flow charts	X	

MAINTAINING COMPUTER EQUIPMENT

	CRT	EET
1 Clean metallic computer parts	X	
2 Clean nonmetallic computer parts	X	
3 Clean electrical connections in computer	X	
4 Clean computer cable connections	X	
5 Clean printer head	X	
6 Clean computer disk drive head	X	
7 Clean and demagnetize computer tape head	X	
8 Lubricate metallic mechanical computer parts	X	
9 Lubricate nonmetallic mechanical computer parts	X	
10 Adjust mechanical computer assemblies	X	
11 Adjust and align computer disk drive head	X	
12 Adjust and align computer tape head	X	
13 Set computer disk read/write/verify speed	X	
14 Set computer tape read/write/verify speed	X	
15 Clean or replace computer filters	X	
16 Clean outside case/cover of computer	X	

SERVICING COMPUTER EQUIPMENT

	CRT	EET
1 Interpret computer troubleshooting charts	X	
2 Interpret chip-swapping charts	X	
3 Interpret computer schematics	X	
4 Interpret manufacturing upgrade	X	
5 Remove and install computer cover	X	
6 Install computer keyboard	X	
7 Install motherboard in computer	X	
8 Install power supply in computer	X	
9 Install analog board in computer	X	
10 Install disk drive assembly in computer	X	
11 Install main logic assembly in computer	X	
12 Install integrated circuit chips in computer	X	
13 Install power light in computer	X	
14 Install on-off switch in computer	X	
15 Install main printed circuit board in computer	X	
16 Install power supply printed circuit board in computer	X	
17 Install drive motor	X	
18 Install print hammer	X	
19 Install print mechanism	X	
20 Install carriage assembly	X	
21 Install paper feed assembly	X	

		CRT	EET
22	Install drive indicator light	X	
23	Install peripheral connection cables	X	
24	Install peripheral connections	X	
25	Install circuit/language cards	X	
26	Install modem coupler	X	
27	Install tape transport assembly	X	
28	Install read/write/verify head	X	
29	Install modem set switch	X	
30	Install ribbon assembly	X	
31	Install drive belts	X	
32	Install AC input connections	X	
33	Install fuse holders and fuses	X	
34	Install ejector mechanisms	X	
35	Install cathode ray tube	X	
36	Install configuration switches	X	
37	Install peripheral controls	X	
38	Install data communications adaptor	X	
39	Install expansion memory	X	
40	Install main memory	X	
41	Install field type product line	X	
42	Install remote terminals	X	
43	Install electrical wiring	X	
44	Install keys on keyboard	X	
45	Repair keyboard	X	
46	Repair motherboard	X	
47	Repair analog board	X	
48	Repair disk drive assembly	X	
49	Repair logic assembly	X	
50	Repair on-off switch	X	
51	Repair mechanical assembly	X	
52	Repair printed circuit board	X	
53	Repair drive motor	X	
54	Repair carriage assembly	X	
55	Repair paper feed assembly	X	
56	Repair circuit/language card	X	
57	Repair tape transport assembly	X	
58	Repair print mechanism	X	
59	Repair read/write/verify head	X	
60	Repair ribbon assembly	X	
61	Repair ejector mechanism	X	
62	Repair peripheral controls	X	
63	Repair data communications adaptor	X	
64	Repair expansion memory	X	
65	Repair memory	X	
66	Repair field type product line	X	
67	Repair remote terminals	X	
68	Identify integrated circuit chips	X	
69	Identify machine components and test points	X	
70	Set configuration switches	X	
71	Set user switches	X	
72	Install mechanical assembly	X	
73	Perform operator duties	X	

	CRT	EET
74 Realign read/write/verify head	X	
75 Adjust motor speed	X	
76 Check AC power source	X	
77 Repair power supply	X	

EMPLOYABILITY SKILLS

DUTY A: Identifying Employment Opportunities

SKILLS:
1 Identify requirements for job
2 Investigate educational opportunities
3 Investigate occupational opportunities
4 Locate resources for finding employment
5 Confer with prospective employers
6 Identify job trends

DUTY B: Applying Employment Seeking Skills

SKILLS:
1 Locate job openings
2 Document skills and abilities (resume)
3 Prepare for interview
4 Participate in interview
5 Complete required tests
6 Complete required forms
7 Write application letter
8 Write follow-up letter
9 Write acceptance letter
10 Evaluate job offer
11 Evaluate job rejection

DUTY C: Interpreting Employment Capabilities

SKILLS:
1 Match interest to job area
2 Match aptitudes to job area
3 Verify abilities
4 Identify immediate work goal
5 Develop career plan

DUTY D: Demonstrating Appropriate Work Behavior

SKILLS:
1 Exhibit dependability
2 Demonstrate punctuality
3 Follow rules and regulations
4 Recognize the consequences of dishonesty
5 Complete assignments in accurate and timely manner
6 Control emotions
7 Assume responsibility for own decisions and actions
8 Exhibit pride and loyalty
9 Exhibit ability to handle pressures and tensions
10 Demonstrate ability to set priorities
11 Demonstrate problem-solving skills

DUTY E: Maintaining Safe and Healthy Environment

SKILLS:
1 Comply with safety and health rules
2 Select correct tools and equipment
3 Utilize equipment correctly

4 Use appropriate action during emergencies
5 Maintain clean and orderly work area
6 Demonstrate personal hygiene and cleanliness

DUTY F: Maintaining Business-Like Image

SKILLS: 1 Participate in company or agency orientation
2 Demonstrate knowledge of company or agency products and services
3 Exhibit positive behavior
4 Read current job-related publications
5 Support and promote employer's company image and purpose
6 Maintain appearance to comply with company standards

DUTY G: Maintaining Working Relationships with Others

SKILLS: 1 Work productively with others
2 Show empathy, respect and support for others
3 Demonstrate proc 'ures and assist others when necessary
4 Recognize, analyze and solve or refer problems
5 Minimize occurrence of problems
6 Channel emotional reaction constructively

DUTY H: Communicating on the Job

SKILLS: 1 Read and comprehend written communications and information
2 Use correct grammar
3 Speak effectively with others
4 Use job-related terminology
5 Listen attentively
6 Write legibly
7 Use telephone etiquette
8 Follow written and oral directions
9 Ask questions
10 Locate information in order to accomplish task
11 Prepare written communication
12 Utilize keyboarding skills
13 Utilize computer skills

DUTY I: Adapting to Change

SKILLS: 1 Recognize need to change
2 Demonstrate willingness to learn
3 Demonstrate flexibility
4 Participate in continuing education
5 Seek work challenges
6 Adjust career goals/plan as needed

DUTY J: Understanding How a Business Works

SKILLS:
1 Recognize the role of business in the enterprise system
2 Identify general responsibilities of employees
3 Identify general responsibilities of management/employers
4 Investigate opportunities and options for business ownership
5 Identify planning processes needed to open a business
6 Participate in meetings

DUTY K: Performing Mathematical Skills

SKILLS:
1 Apply mathematics for problem solving
2 Add and subtract whole numbers, decimals and fractions
3 Multiply and divide whole numbers, decimals and fractions
4 Convert numbers between forms expressed as fractions, decimals and percents
5 Convert between standard American units of measure
6 Convert between standard American units and metric units

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

COMPUTER REPAIR TECHNICIAN

DUTY A: Applying Safety Practices

TASKS:
1 Apply basic emergency first aid techniques
2 Complete accident report
3 Inspect work area and equipment for safe working environment
4 Report shop, environmental and equipment safety violations
5 Demonstrate use of fire extinguishers
6 Plan shutdown procedure for given area
7 Participate in disaster control exercises
8 Prepare plan for disaster control exercises
9 Participate in shop safety committee
10 Organize shop safety committee
11 Correct safety hazards
12 Demonstrate cardiopulmonary resuscitation (CPR) techniques

DUTY B: Analyzing DC Circuits

TASKS:
1 Read and interpret color codes
2 Analyze, construct and troubleshoot series circuits
3 Analyze, construct and troubleshoot parallel circuits
4 Analyze, construct and troubleshoot series-parallel circuits
5 Analyze, construct and troubleshoot voltage dividers
6 Analyze, construct and verify maximum power theory
7 Analyze, construct and troubleshoot resistance x capacitance (RC) and resistance x inductance (RL) circuits

DUTY C: Analyzing AC Circuits

TASKS:
1 Set up and operate frequency counters and signal generators for AC circuits
2 Analyze, construct and troubleshoot AC capacitive circuits using a schematic
3 Analyze, construct and troubleshoot AC inductive circuits using a schematic
4 Analyze and apply principles of transformers to AC circuits using a schematic
5 Analyze, construct and troubleshoot resistor, capicitor and inductor (RCL) circuits using a schematic
6 Analyze, construct and troubleshoot series and parallel resonant circuits using a schematic
7 Analyze, construct and troubleshoot filter circuits using a schematics

DUTY D: Analyzing Solid State Devices

TASKS:
1 Analyze, construct and troubleshoot simple common base amplifiers using a schematic
2 Analyze, construct and troubleshoot simple common emitters using a schematic
3 Analyze, construct and troubleshoot simple common collectors using a schematic
4 Examine field effect transistor (FET) characteristics

5 Analyze, construct and troubleshoot simple common sources using a schematic
6 Analyze, construct and troubleshoot simple common drains using a schematic
7 Analyze, construct and troubleshoot simple common gains using a schematic
8 Analyze, construct and troubleshoot thyristors using a schematic
9 Analyze, construct and troubleshoot integrated circuit operational amplifiers using a schematic
10 Analyze, construct and troubleshoot optoelectronic devices using a schematic

DUTY E: Analyzing Analog Circuits

TASKS:
1 Analyze, construct and troubleshoot single-stage amplifiers using a schematic
2 Analyze, construct and troubleshoot multistage amplifiers using a schematic
3 Analyze, construct and troubleshoot basic power supplies, filters and regulators using a schematic
4 Analyze, construct and troubleshoot differential and operational amplifiers using a schematic
5 Analyze, construct and troubleshoot active filters using a schematic
6 Analyze, construct and troubleshoot oscillators using a schematic
7 Analyze, construct and troubleshoot basic pulse circuits using a schematic
8 Analyze, construct and troubleshoot basic modulation circuits using a schematic

DUTY F: Analyzing Digital Electronic Circuits

TASKS:
1 Analyze and troubleshoot basic digital logic gate integrated circuits using a schematic
2 Verify basic Boolean expressions using basic logic gates
3 Analyze, construct and troubleshoot basic encoding and decoding circuits using a schematic
4 Analyze, construct and troubleshoot flip flops (memory) using a schematic
5 Analyze, construct and troubleshoot shift registers using a schematic
6 Analyze, construct and troubleshoot counters using a schematic
7 Analyze, construct and troubleshoot arithmetic circuits using a schematic
8 Analyze, construct and troubleshoot basic digital logic systems using a schematic

DUTY G: Performing Microprocessing Operations

TASKS:
1 Write, enter, verify and run simple machine language programs
2 Write, enter, verify and run machine language arithmetic programs
3 Write, enter, verify and run machine language branching programs
4 Perform basic programming using algorithms
5 Write, enter, verify and run machine language program using additional addressing modes
6 Perform basic programming using branching, algorithms and flow charting
7 Perform basic programming to demonstrate computer arithmetic
8 Prepare simple program to demonstrate operation of microprocessor unit (MPU) stack, subroutines, input/output (I/O) and interrupts
9 Prepare simple program to perform interface operations with random access memory (RAM) and display
10 Prepare simple program to perform interface operations with switches and light emitted diodes (LEO's)
11 Interface analog to digital converters to microprocessor
12 Interface digital to analog converters to microprocessor

DUTY H: Performing Lab Practices

TASKS:
1 Assemble printed circuit (PC) board
2 Solder wires to turret terminals and printed circuit (PC) boards
3 Assemble and solder printed circuit (PC) board
4 Repair printed circuit (PC) board
5 Set up and operate scales
6 Set up and operate mechanical and optical measuring devices
7 Set up and operate height gauges
8 Set up and operate depth gauges
9 Set up and operate oscilloscopes
10 Set up and operate multimeter and power supplies
11 Set up and operate capacitor inductor analyzers
12 Set up and operate semiconductor testers and curve tracers
13 Set up and operate chart recorder
14 Set up and use digital test equipment

DUTY I: Recording and Reporting Technical Material

TASKS:
1 Record data and design curves and graphs
2 Write reports
3 Make equipment failure reports
4 Specify and requisition simple electronic components
5 Write formal reports of laboratory experiences

DUTY J: Using Technical References

TASKS:
1 Identify manufacturers of various electronic devices using numerical integrated circuit (IC) reference manuals
2 Identify specific characteristics of various electronic devices using manufacturers' reference manuals
3 Identify distributors of various electronic devices using reference manuals
4 Cross-reference various electronic devices between manufacturers using reference manuals
5 Determine maintenance procedures using manuals

DUTY K: Maintaining and Repairing Electrical Systems

TASKS:
1 Replace faulty electrical cords and plugs
2 Determine electrical problems using available troubleshooting techniques
3 Interpret control diagrams for electrical systems
4 Diagnose malfunctions of electrical systems using available test and measurement equipment

DUTY L: Maintaining and Repairing Electronic Systems

TASKS:
1 Determine electronic problems using available troubleshooting techniques
2 Interpret control diagrams for electronic systems
3 Diagnose malfunctions of electronic systems using available test and measurement equipment

DUTY M: Conducting Shop Operations

TASKS:
1 Answer customer questions
2 Troubleshoot customer problems
3 Determine repair method
4 Perform public relations activities
5 Demonstrate computer equipment functions at store
6 Demonstrate software functions
7 Prepare service bill
8 Maintain accounts receivable/paid records
9 Maintain receiving records
10 Maintain shipping records
11 Maintain records of service tools and equipment
12 Maintain computer equipment inventory
13 Maintain call record report
14 Update on-site maintenance log
15 Unpack and inspect new equipment
16 Receive and store parts and supplies
17 Discuss delivery schedule with approved supplier
18 Order parts and supplies
19 Establish customer and equipment history file
20 Establish customer files
21 Prepare items for shipping
22 Update service manuals

23 Update parts catalogs
24 Modify wiring diagrams to reflect repair changes

DUTY N: Performing Housekeeping and Recordkeeping

TASKS:
1 Clean and maintain work area and leave in safe condition
2 Follow tool crib procedures
3 Report problems to supervisor
4 Complete time cards
5 Complete job status reports
6 Make equipment failure reports
7 Use manuals to determine basic maintenance procedures
8 Participate in participation management program (Quality Circles)

DUTY O: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Coordinate workers with work to be done
4 Schedule and control shop flow of jobs
5 Maintain files
6 Maintain service records
7 Maintain labor records
8 Explain work requirements
9 Write technical reports
10 Inventory supplies and equipment
11 Maintain charts, tables, graphs or status boards on work scheduled
12 Check job/time cards
13 Inspect shop equipment and arrange for maintenance and work
14 Coordinate maintenance and repair of shop equipment
15 Develop preventative maintenance program
16 Plan and implement technical training for employees
17 Train new service technicians
18 Evaluate employee progress and performance
19 Follow up employee reports of problems or equipment failures
20 Interview job applicants
21 Estimate cost of equipment installation
22 Estimate cost of system installation
23 Estimate cost of maintenance repairs and downtime
24 Conduct representative meetings

DUTY P: Installing Computer Equipment

TASKS:
1 Determine customer computing requirements
2 Design computer system layout
3 Transport computer equipment
4 Set up computer equipment
5 Perform computer installation tests
6 Demonstrate usage of computer system on-site

7 Complete warranty cards for computer equipment
8 Construct cables for computer equipment

DUTY Q: Evaluating Computer Diagnostics

TASKS:
1 Conduct motherboard random access memory (RAM) test
2 Conduct motherboard read only memory random access (ROM) test
3 Conduct programmers' aid test
4 Conduct computer keyboard test
5 Conduct computer paddle/button test
6 Conduct computer tape read/write/verify test
7 Conduct computer color bar test
8 Conduct computer graphic tablet test
9 Conduct basic/integer read only memory (ROM) card test
10 Conduct computer language card test
11 Conduct computer disk interface card test
12 Conduct computer printer card test
13 Conduct computer serial communication card test
14 Conduct computer monitor test
15 Conduct computer oscilloscope test
16 Conduct computer data communication line test
17 Interpret computer diagnostic flow charts

DUTY R: Maintaining Computer Equipment

TASKS:
1 Clean metallic computer parts
2 Clean nonmetallic computer parts
3 Clean electrical connections in computer
4 Clean computer cable connections
5 Clean printer head
6 Clean computer disk drive head
7 Clean and demagnetize computer tape head
8 Lubricate metallic mechanical computer parts
9 Lubricate nonmetallic mechanical computer parts
10 Adjust mechanical computer assemblies
11 Adjust and align computer disk drive head
12 Adjust and align computer tape head
13 Set computer disk read/write/verify speed
14 Set computer tape read/write/verify speed
15 Clean or replace computer filters
16 Clean outside case/cover of computer

DUTY S: Servicing Computer Equipment

TASKS:
1 Interpret computer troubleshooting charts
2 Interpret chip-swapping charts
3 Interpret computer schematics
4 Interpret manufacturing upgrade
5 Remove and install computer cover
6 Install computer keyboard
7 Install motherboard in computer
8 Install power supply in computer

9 Install analog board in computer
10 Install disk drive assembly in computer
11 Install main logic assembly in computer
12 Install integrated circuit chips in computer
13 Install power light in computer
14 Install on-off switch in computer
15 Install main printed circuit board in computer
16 Install power supply printed circuit board in computer
17 Install drive motor
18 Install print hammer
19 Install print mechanism
20 Install carriage assembly
21 Install paper feed assembly
22 Install drive indicator light
23 Install peripheral connection cables
24 Install peripheral connections
25 Install circuit/language cards
26 Install modem coupler
27 Install tape transport assembly
28 Install read/write/verify head
29 Install modem set switch
30 Install ribbon assembly
31 Install drive belts
32 Install AC input connections
33 Install fuse holders and fuses
34 Install ejector mechanisms
35 Install cathode ray tube
36 Install configuration switches
37 Install peripheral controls
38 Install data communications adaptor
39 Install expansion memory
40 Install main memory
41 Install field type product line
42 Install remote terminals
43 Install electrical wiring
44 Install keys on keyboard
45 Repair keyboard
46 Repair motherboard
47 Repair analog board
48 Repair disk drive assembly
49 Repair logic assembly
50 Repair on-off switch
51 Repair mechanical assembly
52 Repair printed circuit board
53 Repair drive motor
54 Repair carriage assembly
55 Repair paper feed assembly
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58 Repair print mechanism
59 Repair read/write/verify head
60 Repair ribbon assembly
61 Repair ejector mechanism
62 Repair peripheral controls
63 Repair data communications adaptor
64 Repair expansion memory

65 Repair memory
66 Repair field type product line
67 Repair remote terminals
68 Identify integrated circuit chips
69 Identify machine components and test points
70 Set configuration switches
71 Set user switches
72 Install mechanical assembly
73 Perform operator duties
74 Realign read/write/verify head
75 Adjust motor speed
76 Check AC power source
77 Repair power supply

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

ELECTRICAL AND ELECTRONIC TECHNICIAN

DUTY A: Applying Safety Practices

TASKS:
1 Apply basic emergency first aid techniques
2 Complete accident report
3 Inspect work area and equipment for safe working environment
4 Report shop, environmental and equipment safety violations
5 Demonstrate use of fire extinguishers
6 Plan shutdown procedure for given area
7 Participate in disaster control exercises
8 Prepare plan for disaster control exercises
9 Participate in shop safety committee
10 Organize shop safety committee
11 Correct safety hazards
12 Demonstrate cardiopulmonary resuscitation (CPR) techniques

DUTY B: Analyzing DC Circuits

TASKS:
1 Read and interpret color codes
2 Analyze, construct and troubleshoot series circuits
3 Analyze, construct and troubleshoot parallel circuits
4 Analyze, construct and troubleshoot series-parallel circuits
5 Analyze, construct and troubleshoot voltage dividers
6 Analyze, construct and verify maximum power theory
7 Analyze, construct and troubleshoot resistance x capacitance (RC) and resistance x inductance (RL) circuits

DUTY C: Analyzing AC Circuits

TASKS:
1 Set up and operate frequency counters and signal generators for AC circuits
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6 Analyze, construct and troubleshoot series and parallel resonant circuits using a schematic
7 Analyze, construct and troubleshoot filter circuits using a schematic

DUTY D: Analyzing Solid State Devices

TASKS:
1 Analyze, construct and troubleshoot simple common base amplifiers using a schematic
2 Analyze, construct and troubleshoot simple common emitters using a schematic
3 Analyze, construct and troubleshoot simple common collectors using a schematic
4 Examine field effect transistor (FET) characteristics

5 Analyze, construct and troubleshoot simple common sources using a schematic
6 Analyze, construct and troubleshoot simple common drains using a schematic
7 Analyze, construct and troubleshoot simple common gains using a schematic
8 Analyze, construct and troubleshoot thyristors using a schematic
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DUTY E: Analyzing Analog Circuits

TASKS:
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DUTY F: Analyzing Digital Electronic Circuits

TASKS:
1 Analyze and troubleshoot basic digital logic gate integrated circuits using a schematic
2 Verify basic Boolean expressions using basic logic gates
3 Analyze, construct and troubleshoot basic encoding and decoding circuits using a schematic
4 Analyze, construct and troubleshoot flip flops (memory) using a schematic
5 Analyze, construct and troubleshoot shift registers using a schematic
6 Analyze, construct and troubleshoot counters using a schematic
7 Analyze, construct and troubleshoot arithmetic circuits using a schematic
8 Analyze, construct and troubleshoot basic digital logic systems using a schematic

DUTY G: Performing Microprocessing Operations

TASKS:
1 Write, enter, verify and run simple machine language programs
2 Write, enter, verify and run machine language arithmetic programs
3 Write, enter, verify and run machine language branching programs
4 Perform basic programming using algorithms
5 Write, enter, verify and run machine language program using additional addressing modes
6 Perform basic programming using branching, algorithms and flow charting
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8 Prepare simple program to demonstrate operation of microprocessor unit (MPU) stack, subroutines, input/output (I/O) and interrupts
9 Prepare simple program to perform interface operations with random access memory (RAM) and display
10 Prepare simple program to perform interface operations with switches and light emitted diodes (LEO's)
11 Interface analog to digital converters to microprocessor
12 Interface digital to analog converters to microprocessor

DUTY H: Performing Lab Practices

TASKS:
1 Assemble printed circuit (PC) board
2 Solder wires to turret terminals and printed circuit (PC) boards
3 Assemble and solder printed circuit (PC) board
4 Repair printed circuit (PC) board
5 Set up and operate scales
6 Set up and operate mechanical and optical measuring devices
7 Set up and operate height gauges
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9 Set up and operate oscilloscopes
10 Set up and operate multimeter and power supplies
11 Set up and operate capacitor inductor analyzers
12 Set up and operate semiconductor testers and curve tracers
13 Set up and operate chart recorder
14 Set up and use digital test equipment

DUTY I: Recording and Reporting Technical Material

TASKS:
1 Record data and design curves and graphs
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TASKS:
1 Identify manufacturers of various electronic devices using numerical integrated circuit (IC) reference manuals
2 Identify specific characteristics of various electronic devices using manufacturers' reference manuals
3 Identify distributors of various electronic devices using reference manuals
4 Cross-reference various electronic devices between manufacturers using reference manuals
5 Determine maintenance procedures using manuals

DUTY K: Maintaining and Repairing Electrical Systems

TASKS:
1 Replace faulty electrical cords and plugs
2 Determine electrical problems using available troubleshooting techniques
3 Interpret control diagrams for electrical systems
4 Diagnose malfunctions of electrical systems using available test and measurement equipment

DUTY L: Maintaining and Repairing Electronic Systems

TASKS:
1 Determine electronic problems using available troubleshooting techniques
2 Interpret control diagrams for electronic systems
3 Diagnose malfunctions of electronic systems using available test and measurement equipment

DUTY M: Conducting Shop Operations

TASKS:
1 Answer customer questions
2 Troubleshoot customer problems
3 Determine repair method
4 Perform public relations activities
5 Demonstrate computer equipment functions at store
6 Demonstrate software functions
7 Prepare service bill
8 Maintain accounts receivable/paid records
9 Maintain receiving records
10 Maintain shipping records
11 Maintain records of service tools and equipment
12 Maintain computer equipment inventory
13 Maintain call record report
14 Update on-site maintenance log
15 Unpack and inspect new equipment
16 Receive and store parts and supplies
17 Discuss delivery schedule with approved supplier
18 Order parts and supplies
19 Establish customer and equipment history file
20 Establish customer files
21 Prepare items for shipping
22 Update service manuals

23 Update parts catalogs
24 Modify wiring diagrams to reflect repair changes

DUTY N: Performing Housekeeping and Recordkeeping

TASKS:
1 Clean and maintain work area and leave in safe condition
2 Follow tool crib procedures
3 Report problems to supervisor
4 Complete time cards
5 Complete job status reports
6 Make equipment failure reports
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8 Participate in participation management program (Quality Circles)

DUTY O: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Coordinate workers with work to be done
4 Schedule and control shop flow of jobs
5 Maintain files
6 Maintain service records
7 Maintain labor records
8 Explain work requirements
9 Write technical reports
10 Inventory supplies and equipment
11 Maintain charts, tables, graphs or status boards on work scheduled
12 Check job/time cards
13 Inspect shop equipment and arrange for maintenance and work
14 Coordinate maintenance and repair of shop equipment
15 Develop preventative maintenance program
16 Plan and implement technical training for employees
17 Train new service technicians
18 Evaluate employee progress and performance
19 Follow up employee reports of problems or equipment failures
20 Interview job applicants
21 Estimate cost of equipment installation
22 Estimate cost of system installation
23 Estimate cost of maintenance repairs and downtime
24 Conduct representative meetings

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Education For Employment Task Lists

Illinois State Board of Education

Adult Vocational and Technical Education

INDUSTRIAL OCCUPATIONS

Drafter/Computer-Aided Drafter

*Employability Skills

*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

EMPLOYABILITY SKILLS

DUTY A: Identifying Employment Opportunities

SKILLS:
1 Identify requirements for job
2 Investigate educational opportunities
3 Investigate occupational opportunities
4 Locate resources for finding employment
5 Confer with prospective employers
6 Identify job trends

DUTY B: Applying Employment Seeking Skills

SKILLS:
1 Locate job openings
2 Document skills and abilities (resume)
3 Prepare for interview
4 Participate in interview
5 Complete required tests
6 Complete required forms
7 Write application letter
8 Write follow-up letter
9 Write acceptance letter
10 Evaluate job offer
11 Evaluate job rejection

DUTY C: Interpreting Employment Capabilities

SKILLS:
1 Match interest to job area
2 Match aptitudes to job area
3 Verify abilities
4 Identify immediate work goal
5 Develop career plan

DUTY D: Demonstrating Appropriate Work Behavior

SKILLS:
1 Exhibit dependability
2 Demonstrate punctuality
3 Follow rules and regulations
4 Recognize the consequences of dishonesty
5 Complete assignments in accurate and timely manner
6 Control emotions
7 Assume responsibility for own decisions and actions
8 Exhibit pride and loyalty
9 Exhibit ability to handle pressures and tensions
10 Demonstrate ability to set priorities
11 Demonstrate problem-solving skills

DUTY E: Maintaining Safe and Healthy Environment

SKILLS:
1 Comply with safety and health rules
2 Select correct tools and equipment
3 Utilize equipment correctly

4 Use appropriate action during emergencies
5 Maintain clean and orderly work area
6 Demonstrate personal hygiene and cleanliness

DUTY F: Maintaining Business-Like Image

SKILLS: 1 Participate in company or agency orientation
2 Demonstrate knowledge of company or agency products and services
3 Exhibit positive behavior
4 Read current job-related publications
5 Support and promote employer's company image and purpose
6 Maintain appearance to comply with company standards

DUTY G: Maintaining Working Relationships with Others

SKILLS: 1 Work productively with others
2 Show empathy, respect and support for others
3 Demonstrate procedures and assist others when necessary
4 Recognize, analyze and solve or refer problems
5 Minimize occurrence of problems
6 Channel emotional reaction constructively

DUTY H: Communicating on the Job

SKILLS: 1 Read and comprehend written communications and information
2 Use correct grammar
3 Speak effectively with others
4 Use job-related terminology
5 Listen attentively
6 Write legibly
7 Use telephone etiquette
8 Follow written and oral directions
9 Ask questions
10 Locate information in order to accomplish task
11 Prepare written communication
12 Utilize keyboarding skills
13 Utilize computer skills

DUTY I: Adapting to Change

SKILLS: 1 Recognize need to change
2 Demonstrate willingness to learn
3 Demonstrate flexibility
4 Participate in continuing education
5 Seek work challenges
6 Adjust career goals/plan as needed

DUTY J: Understanding How a Business Works

SKILLS:
1 Recognize the role of business in the enterprise system
2 Identify general responsibilities of employees
3 Identify general responsibilities of management/employers
4 Investigate opportunities and options for business ownership
5 Identify planning processes needed to open a business
6 Participate in meetings

DUTY K: Performing Mathematical Skills

SKILLS:
1 Apply mathematics for problem solving
2 Add and subtract whole numbers, decimals and fractions
3 Multiply and divide whole numbers, decimals and fractions
4 Convert numbers between forms expressed as fractions, decimals and percents
5 Convert between standard American units of measure
6 Convert between standard American units and metric units

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DRAFTER/COMPUTER-AIDED DRAFTER

Duty A: Planning and Organizing Activities

Tasks:
1 Determine scope of a drafting job
2 Determine numbers and sizes of drawings
3 Apply appropriate drafting standards to drawings
4 Select appropriate drafting techniques for assigned drawings
5 Maintain supporting documents for drawing files

Duty B: Researching Information

Tasks:
1 Locate information using manufacturers' catalogs
2 Locate information using engineering handbooks
3 Locate information using microfilm files
4 Locate information using computer data files
5 Confirm materials availability
6 Research architectural graphic standards

Duty C: Performing General Office Procedures

Tasks:
1 Maintain client rapport
2 Participate in client conferences
3 Interpret plans
4 Coordinate work with engineering personnel
5 Coordinate work with welding shop personnel
6 Coordinate work with sheet metal shop personnel
7 Coordinate architectural drawings
8 Coordinate civil drawings
9 Coordinate structural drawings
10 Coordinate mechanical drawings
11 Coordinate electrical drawings
12 Coordinate other drawings
13 Check plan dimensions
14 Maintain drafting instruments and equipment
15 Clean drafting instruments and equipment
16 File original working drawings
17 Maintain and care for CAD work station
18 Start up, log/on, retrieve, save, log/off and shut down CAD system
19 Analyze and communicate equipment failure
20 Produce schedules

Duty D: Preparing Sketches

Tasks:
1 Draw freehand sketches
2 Draw isometric sketches
3 Draw orthographic sketches
4 Draw pictorial sketches
5 Read and transfer measurements
6 Prepare proportional design sketches
7 Draw oblique sketches

Duty E: Performing Basic Layouts

Tasks:
1 Work from written instructions to produce drawings
2 Work from verbal instructions to produce drawings
3 Perform basic layouts to specified tolerances
4 Render designs in pencil

Duty F: Detailing Drawings

Tasks:
1 Draw individual parts from assembly drawings
2 Draw individual parts from existing parts
3 Interpret assembly drawings
4 Draw orthographic projections
5 Draw sectional views
6 Draw auxiliary views
7 Draw isometric views
8 Draw intersection and development drawings
9 Dimension and tolerance drawings
10 Apply geometric tolerances to drawings
11 Apply standard fits to drawings
12 Apply x-y coordinate dimensioning standards to drawings
13 Add title block information to drawings
14 Letter presentation drawings
15 Note special instructions on drawings

Duty G: Using Reproduction Techniques

Tasks:
1 Reproduce drawings on blueprint machines
2 Reproduce drawings on dry copy machines
3 Create hard copy using a plotter
4 Create hard copy using a printer
5 Copy existing drawings using digitizing techniques

Duty H: Performing Presentation Techniques

Tasks:
1 Prepare plan abbreviations list
2 Produce graphs
3 Produce flow diagrams

Duty I: Producing Architectural Drawings

Tasks:
1 Construct architectural symbols
2 Produce representative architectural drawings
3 Interpret local, state and federal architectural codes
4 Complete FHA specification forms
5 Check architectural drawings
6 Draw presentation floor plans
7 Draw presentation elevation views
8 Draw one point interior presentation views
9 Draw two point interior presentation views
10 Draw exterior perspective views

11 Illustrate landscape features
12 Sketch preliminary plan layouts
13 Sketch preliminary elevations
14 Sketch preliminary sections
15 Draw scaled floor plans
16 Draw foundation plans
17 Draw foundation sections
18 Reproduce common plan features
19 Draw exterior elevations
20 Draw framing plans
21 Draw typical wall sections
22 Draw parapet and roof sections
23 Dimension section drawings
24 Draw stair sections
25 Draw fireplace sections
26 Draw chimney sections
27 Draw door sections
28 Draw window sections
29 Draw bathroom sections
30 Draw cabinet sections and details
31 Draw millwork (trim) sections
32 Draw door and window schedules
33 Draw finish schedules
34 Draw floor sections
35 Draw attic sections
36 Draw shaft sections
37 Draw typical closet sections
38 Prepare residential house plumbing plans
39 Prepare residential house HVAC plans
40 Prepare residential house electrical plans

Duty J: Drawing Light Commercial Building Plans

Tasks:
1 Draw commercial building floor plans
2 Draw commercial building foundation plans
3 Draw commercial building framing plans
4 Draw commercial building roof plans
5 Draw commercial building site plans
6 Draw commercial building elevations
7 Construct commercial building section drawings
8 Prepare commercial building door, window and finish schedules
9 Prepare commercial building plumbing plans
10 Prepare commercial building HVAC plans
11 Prepare commercial building electrical plans
12 Prepare commercial building landscape plans
13 Dimension commercial building plans
14 Check commercial building plans
15 Prepare commercial building quantity estimates

Duty K: Producing Structural Working Drawings

Tasks:
1 Construct structural drafting symbols
2 Interpret local, state and federal structural codes

3 Prepare bills of materials from structural drawings
4 Draw structural steel plans
5 Dimension structural steel drawings
6 Draw beam connections
7 Construct column detail drawings
8 Construct detail truss drawings for timber
9 Prepare structural foundation and slab plans
10 Prepare structural floor framing plans
11 Prepare structural roof framing plans
12 Draw structural sections and details
13 Draw structural concrete foundation plans
14 Prepare column and beam schedule for structural steel
15 Prepare column and beam schedule for reinforcing steel
16 Check structural drawings

Duty L: Producing Mechanical Working Drawings

Tasks:
1 Construct mechanical drafting symbols
2 Construct sheet metal drafting symbols
3 Construct tool design symbols
4 Prepare bills of materials from mechanical drawings
5 Produce parts lists for mechanical assembly drawings
6 Construct mechanical orthographic assembly drawings
7 Construct mechanical orthographic subassembly drawings
8 Detail components of mechanical orthographic assembly drawings
9 Detail components of mechanical orthographic subassembly drawings
10 Construct mechanical isometric assembly drawings
11 Construct mechanical isometric subassembly drawings
12 Construct mechanical isometric exploded view drawings
13 Construct jig drawings
14 Construct fixture drawings
15 Construct sheet metal development drawings
16 Construct HVAC drawings
17 Construct forming die drawings
18 Check mechanical drawings
19 Design new equipment

Duty M: Producing Electrical and Electronic Working Drawings

Tasks:
1 Construct electrical drafting symbols
2 Construct electronic drafting symbols
3 Prepare bills of materials from electrical drawings
4 Prepare bills of materials from electronic drawings
5 Interpret local, state and federal electrical codes
6 Draw electrical block diagrams
7 Draw electrical schematic diagrams
8 Draw electrical connection diagrams
9 Draw electronic block diagrams
10 Draw electronic schematic diagrams
11 Draw electronic connection diagrams
12 Draw industrial controls ladder diagrams
13 Draw electrical power single-line diagrams

Duty N: Producing Civil Engineering Drawings

Tasks:
1 Produce detailed construction drawings
2 Develop topographical profiles
3 Develop specification sheets for highway construction
4 Develop specification sheets for river and harbor improvements
5 Produce plans for flood control

Duty O: Using CAD Command Processes

Tasks:
1 Build data base
2 Edit data base
3 Create plotter files
4 Create disk files
5 Copy disk files
6 Execute specialized programs
7 Develop backup files
8 Restore backup files
9 Develop configure/control changes
10 Develop execute lists using command language
11 Write simple FORTRAN program

Duty P: Producing Drawings Using CAD

Tasks:
1 Generate grid on drawing
2 Select appropriate geometry to create lines, circles and arcs
3 Select appropriate geometry to create curves, tangents, fillets, chamfers and bevels
4 Develop three-dimensional drawings
5 Select appropriate line work, weights and color
6 Apply layering techniques

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Education For Employment Task Lists

Illinois State Board of Education

Adult Vocational and Technical Education

INDUSTRIAL OCCUPATIONS

TRANSPORTATION CLUSTER

Auto Mechanic

Diesel Mechanic

*Employability Skills

*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

TRANSPORTATION CLUSTER MATRIX

AM = Automotive Mechanic
DM = Diesel Mechanic

PREPARING NEW VEHICLES

		AM	DM
1	Adjust and lubricate door hinges and striker plates	X	X
2	Locate water leaks	X	X
3	Seal water leaks	X	X
4	Locate duct leaks	X	X
5	Seal duct leaks	X	X
6	Locate rattles and noises	X	
7	Install door moldings	X	
8	Remove and replace window regulators	X	X
9	Adjust window regulators	X	X
10	Install air shocks	X	X
11	Install C.B. and radios	X	X

SERVICING SUSPENSION SYSTEMS

		AM	DM
1	Inspect suspension systems for worn parts	X	X
2	Remove and replace suspension bushings and king pins	X	X
3	Inspect tires and wheels for damage and irregular wear	X	X
4	Remove and replace front wheel bearings (drum brakes)	X	X
5	Remove and replace front wheel bearings (disc brakes)	X	X
6	Repack wheel bearings	X	X
7	Remove and replace shock absorbers	X	X
8	Remove and replace control arms	X	X
9	Remove and replace ball joints	X	X
10	Remove and replace torsion bars	X	X
11	Remove and replace coil springs	X	X
12	Remove and replace spindle	X	X
13	Remove and replace McPherson strut assembly	X	
14	Rebuild McPherson strut assembly	X	
15	Remove and replace trunnion pin assembly	X	X
16	Remove and replace leaf spring assembly	X	X
17	Remove and replace spring hangers	X	X
18	Remove and replace "I" beam	X	X
19	Remove and replace stabilizer and bushings	X	X
20	Replace idler arm	X	X
21	Replace pitman arm	X	X
22	Inspect walking beams		X
23	Replace walking beams		X
24	Inspect torque arms	X	X
25	Replace torque arms	X	X
26	Inspect and adjust torsion bar	X	X
27	Inspect ball joints	X	X

SERVICING HEATING AND COOLING SYSTEMS

		AM	DM
1	Determine cause of overheating	X	X
2	Test thermal sensing switch	X	X
3	Remove and replace thermal sensing switch	X	X
4	Remove and replace drive belts	X	X
5	Test coolant freezing point	X	X
6	Install antifreeze	X	X
7	Inspect and replace water hoses	X	X

	AM	DM
8 Check variable speed fan clutch	X	X
9 Remove and replace variable speed fan clutch	X	X
10 Remove and replace electric cooling fan motor	X	X
11 Chemically clean cooling system	X	X
12 Remove and replace thermostat	X	X
13 Test thermostat	X	X
14 Test coolant pressure caps	X	X
15 Pressure test cooling system	X	X
16 Remove and replace heater hoses	X	X
17 Remove and replace radiator hoses	X	X
18 Remove and replace radiator	X	X
19 Rebuild blower assembly on air-cooled engines	X	X
20 Remove and replace heater cores	X	X
21 Remove and replace water pump	X	X
22 Inspect shutter stat		X

PERFORMING STEERING AND WHEEL SERVICES

	AM	DM
1 Inspect steering gear and linkage for worn parts	X	X
2 Check and service fluid level	X	X
3 Lubricate steering gear and linkage	X	X
4 Test tire pressure	X	X
5 Rotate tires	X	
6 Balance wheel and tire assembly	X	X
7 Adjust steering sector	X	X
8 Remove and replace steering linkage components	X	X
9 Remove and replace manual steering sector	X	X
10 Remove and replace steering damper	X	X
11 Remove and replace power steering hoses	X	X
12 Remove and replace belt(s) and set tension	X	X
13 Remove and replace power steering cylinder	X	X
14 Remove and replace power steering control valve assembly	X	X
15 Rebuild power steering control valve assembly	X	X
16 Remove and replace power steering pump	X	X
17 Rebuild rack and pinion power steering assembly	X	X
18 Rebuild rack and pinion manual steering assembly	X	X
19 Adjust toe-in	X	X
20 Align front end	X	X
21 Align rear wheels	X	X
22 Remove and replace turn signal switch	X	X
23 Remove and replace ignition switch rack	X	X
24 Remove and replace steering wheel	X	X
25 Remove and replace mast jacket	X	X
26 Set center line steering	X	X
27 Check steering axis inclination	X	X
28 Remove and replace tilt wheel and telescope	X	X
29 Remove and replace power steering seals	X	X
30 Remove and replace four-way switch	X	X
31 Rebuild steering column	X	X
32 Remove and replace steering column bearings, shift tube and socket	X	X
33 Remove and replace steering column	X	X
34 Replace shift detent in column	X	X
35 Remove and replace rack and pinion power steering assembly	X	X

SERVICING BRAKE SYSTEMS

		AM	DM
1	Check brake operation	X	X
2	Inspect brake hoses and lines	X	X
3	Flush brake system	X	X
4	Adjust brake shoes	X	X
5	Free up parking brake cable and linkage	X	
6	Adjust parking brake linkage	X	
7	Remove and replace parking brake cable and linkage	X	
8	Remove and replace parking brake external band	X	
9	Remove and replace brake shoes	X	X
10	Remove and replace self-adjusters	X	
11	Remove and replace wheel cylinder	X	X
12	Rebuild wheel cylinder	X	X
13	Cam grind brake shoe	X	X
14	Grind (turn) brake drum	X	X
15	Recondition backing plate	X	X
16	Remove and replace disc brake rotor	X	X
17	Reface disc brake rotor	X	X
18	Remove and replace caliper assembly	X	X
19	Rebuild caliper assembly	X	X
20	Remove and replace master cylinder	X	X
21	Rebuild master cylinder	X	X
22	Remove and replace hydraulic power brake unit	X	X
23	Remove and replace hydrobrake booster unit	X	X
24	Bleed brake system	X	X
25	Remove and replace proportioning meter (combination valve)	X	X
26	Test brake antilock system	X	X
27	Replace defective components in brake antilock system	X	X
28	Test rotor parallelism	X	X
29	Test rotor runout	X	X
30	Torque wheel lug nuts	X	X
31	Check and service fluid level	X	X
32	Replace wheels	X	X
33	Repack wheel bearings	X	X
34	Replace hydraulic lines and hoses	X	X
35	Adjust air brakes	X	X
36	Inspect air valves		X
37	Replace air valves		X
38	Inspect compressor		X
39	Replace air compressor		X
40	Test air compressor governor		X
41	Replace air compressor governor		X
42	Inspect antiskid system		X
43	Inspect air chambers		X
44	Replace air chambers		X
45	Inspect parking brake chamber		X
46	Replace parking brake chamber		X
47	Test air system for leaks		X
48	Reline air brake		X
49	Replace air valves		X

SERVICING EMISSION CONTROL SYSTEMS

		AM	DM
1	Test emission control system using propane enrichment apparatus	X	
2	Remove and replace vacuum hoses	X	X

	AM	DM
3 Test positive crankcase ventilation system	X	
4 Remove and replace positive crankcase ventilation valve	X	
5 Remove and replace positive crankcase ventilation valve hose(s)	X	
6 Test vacuum advance/retard device	X	
7 Remove and replace vacuum advance/retard device	X	
8 Test electrical advance/retard device	X	
9 Check idle solenoid	X	
10 Remove and replace idle solenoid	X	
11 Remove and replace deceleration valve	X	
12 Test thermostatic air cleaner	X	X
13 Adjust thermostatic air cleaner	X	X
14 Remove and replace thermostatic air cleaner	X	X
15 Check exhaust gas recirculation valve operation	X	
16 Remove and replace exhaust gas recirculation valve	X	
17 Check air injection system	X	
18 Remove and replace air pump	X	
19 Remove and repair diverter and anti-backfire valve	X	
20 Test fuel evaporation system	X	
21 Remove and replace closed system charcoal canister filter	X	
22 Test back pressure of exhaust system	X	
23 Remove and replace catalytic converter	X	
24 Remove and replace beads in catalytic converter	X	
25 Test exhaust oxygen sensor	X	
26 Remove and replace exhaust oxygen sensor	X	
27 Test electronic fuel mixture control system	X	

SERVICING EXHAUST SYSTEMS

	AM	DM
1 Check exhaust system for leaks and restrictions	X	X
2 Remove and replace exhaust system supports	X	X
3 Remove and replace converter beads	X	
4 Remove and replace catalytic converter	X	
5 Remove and replace muffler	X	X
6 Remove and replace exhaust pipe	X	X
7 Remove and replace tail pipe	X	X
8 Remove and replace exhaust manifold	X	X
9 Inspect exhaust system	X	X
10 Inspect exhaust manifold	X	X
11 Inspect turbocharger	X	X
12 Replace turbocharger	X	X
13 Rebuild turbocharger	X	X

SERVICING HEATING AND AIR-CONDITIONING SYSTEMS

	AM	DM
1 Inspect control cables	X	X
2 Test electrical control circuits	X	X
3 Remove and replace compressor belts	X	X
4 Test vacuum components	X	X
5 Remove and replace vacuum components	X	X
6 Test air-conditioning thermal switch	X	X
7 Test blower motor	X	X
8 Remove and replace blower motor	X	X
9 Test thermostatic clutch switch	X	X
10 Remove and replace thermostatic clutch switch	X	X
11 Inspect air-conditioning magnetic clutch switch	X	X

	AM	DM
12 Remove and replace air-conditioning magnetic clutch switch (piston type)	X	X
13 Inspect clutch and pulley assembly	X	X
14 Remove and replace clutch and hub assembly (rotary type)	X	X
15 Test air conditioner charge	X	X
16 Charge system using pound cans	X	X
17 Charge system using bulk source	X	X
18 Perform leak test with halide torch	X	X
19 Perform leak test with electronic tester	X	X
20 Remove and replace refrigerant lines	X	X
21 Fabricate refrigerant lines	X	X
22 Remove and replace compressor seals	X	X
23 Check compressor oil level	X	X
24 Inspect dryer	X	X
25 Remove and replace dryer in air-conditioning unit	X	X
26 Remove and replace condenser in air-conditioning unit	X	X
27 Remove and replace evaporator	X	X
28 Remove and replace metering orifice valve (expansion valve)	X	X
29 Test throttle-suctioning valve	X	X
30 Remove and replace throttle-suctioning valve	X	X
31 Test compressor reed plates	X	X
32 Remove and replace compressor reed plates	X	X
33 Remove and replace compressor	X	X
34 Rebuild rotary compressor (swash-plate)	X	X
35 Remove and replace heater core	X	X
36 Install air-conditioning system	X	X
37 Remove and replace low pressure cutout switch	X	X
38 Remove and replace high pressure cutout switch	X	X
39 Evacuate and charge refrigeration system	X	X
40 Check system for leaks	X	X
41 Replace refrigeration clutch	X	X
42 Inspect refrigeration controls	X	X
43 Repair refrigeration controls	X	X

SERVICING FUEL SYSTEMS

	AM	DM
1 Test carburetor adjustment using combustion analyzer	X	
2 Test carburetor adjustment using infrared tester	X	
3 Test carburetor adjustment using propane enrichment apparatus	X	
4 Adjust carburetor idle mixture	X	
5 Adjust antistall device	X	
6 Inspect carburetor linkage for binding and worn parts	X	
7 Check carburetor for vacuum leaks	X	
8 Remove and replace carburetor air cleaner	X	
9 Clean automatic choke	X	
10 Adjust automatic choke	X	
11 Free up manifold heat riser valve	X	
12 Remove and replace manifold heat riser valve	X	
13 Clean heat riser passages	X	
14 Adjust float	X	
15 Adjust carburetor metering rods	X	
16 Remove and replace carburetor metering jets	X	
17 Remove and replace carburetor	X	
18 Rebuild carburetor	X	
19 Remove and replace fuel filter unit	X	X

	AM	DM
20 Test and adjust fuel pump	X	X
21 Remove and replace fuel pump	X	X
22 Test and adjust fuel injection system	X	X
23 Remove and replace electrical fuel injector computer	X	
24 Test wiring harness of electronic fuel injection system	X	
25 Remove and replace fuel injection nozzle	X	X
26 Rebuild fuel injection nozzle	X	X
27 Remove and replace fuel injection pump	X	X
28 Rebuild fuel injection pump	X	X
29 Check waste gate adjustment	X	X
30 Adjust waste gate adjustment	X	X
31 Remove and replace turbocharger	X	X
32 Rebuild turbocharger	X	X
33 Remove and replace fuel lines	X	X
34 Remove and replace fuel tank	X	X
35 Remove and replace fuel level sending unit	X	X
36 Test electronic fuel mixture control system	X	X
37 Time diesel engine injector pump	X	X
38 Remove and replace injector (diesel)	X	X
39 Remove and replace injector line (diesel)	X	X
40 Test injector spray pattern (diesel)	X	X
41 Test calibration of injector lines (diesel)	X	X
42 Bleed fuel system	X	X
43 Clean fuel filter	X	X
44 Check air cleaner element	X	X
45 Clean air cleaner element	X	X
46 Remove and replace wiring harness of electronic fuel system	X	

SERVICING IGNITION SYSTEMS

	AM	DM
1 Test engine using engine analyzer	X	
2 Test point dwell	X	
3 Remove and replace distributor cap	X	
4 Remove and replace distributor rotor	X	
5 Inspect distributor for worn parts	X	
6 Remove and replace points	X	
7 Remove and replace condenser	X	
8 Test condenser	X	
9 Remove and replace distributor	X	
10 Rebuild distributor	X	
11 Test control unit (electronic)	X	
12 Remove and replace control unit (electronic)	X	
13 Test pickup coil (electronic)	X	
14 Remove and replace pickup coil (electronic)	X	
15 Test automatic spark advance mechanism	X	
16 Remove and replace spark advance mechanism	X	
17 Adjust point dwell	X	
18 Test ignition timing	X	
19 Adjust ignition timing	X	
20 Test ignition coil	X	
21 Test primary circuit resistance	X	
22 Test secondary circuit continuity	X	
23 Test spark plug wire resistance	X	
24 Remove and replace spark plug wires	X	
25 Remove and replace spark plugs	X	

		AM	DM
26	Clean spark plugs	X	
27	Gap spark plugs	X	
28	Test glow plug electrical system	X	X
29	Test glow plug	X	X
30	Remove and replace glow plug	X	X
31	Test solenoid	X	X
32	Replace solenoid	X	X
33	Test distributor	X	
34	Time distributor to engine	X	
35	Test generator/alternator	X	X
36	Replace generator/alternator	X	X
37	Test regulator	X	X
38	Replace regulator	X	X

SERVICING AUTOMATIC TRANSMISSIONS

		AM	DM
1	Pressure test transmission in vehicle	X	X
2	Stall test automatic transmission in vehicle	X	X
3	Clean transmission oil strainer	X	X
4	Remove and replace transmission oil filter	X	X
5	Adjust automatic transmission shift linkage	X	X
6	Test vacuum shift modulator	X	X
7	Remove and replace vacuum shift modulator	X	X
8	Adjust bands	X	X
9	Remove and replace transmission governor	X	X
10	Clean transmission governor	X	X
11	Clean transmission valve body	X	X
12	Remove and replace automatic transmission with convertor assembly	X	X
13	Remove and replace automatic transmission without convertor assembly	X	X
14	Rebuild automatic transmission assembly	X	X
15	Measure convertor turbine end play	X	X
16	Air pressure test transmission on bench	X	X
17	Pressure flush converter assembly	X	X
18	Pressure flush automatic transmission cooler assembly	X	X
19	Remove and replace torque converter	X	X
20	Remove and replace extension housing seal and bushing	X	X
21	Splice cooler lines	X	X
22	Replenish transmission oil	X	X
23	Test electrical controls of automatic clutch converter	X	X
24	Inspect and replace automatic transmission	X	X
25	Inspect and service drive shaft and U-joints	X	X
26	Replace U-joints	X	X
27	Replace single speed differential	X	X
28	Rebuild single speed differential	X	X
29	Replace two-speed differential		X
30	Rebuild shift unit		X
31	Replace power divider		X
32	Rebuild power divider		X
33	Replace axles and seals	X	X
34	Replace power takeoff		X

PERFORMING ENGINE MECHANICAL DIAGNOSIS

	AM	DM
1 Test cylinder balance using engine analyzer	X	
2 Test cylinder leakage	X	X
3 Inspect engine for vacuum leaks	X	X
4 Inspect engine for oil leaks	X	X
5 Inspect to determine cause of overheating	X	X
6 Inspect cooling system for source of coolant loss	X	X
7 Inspect valve train and guides for cause of malfunctions	X	X
8 Inspect engine for source of mechanical engine noise	X	X

SERVICING ENGINE BLOCKS

	AM	DM
1 Steam clean engine	X	X
2 Test oil pump pressure	X	X
3 Test oil pressure relief valve	X	X
4 Remove and replace motor mounts	X	X
5 Remove and replace engine assembly	X	X
6 Remove and replace oil pan	X	X
7 Remove and replace rod bearing(s)	X	X
8 Remove and replace crankshaft	X	X
9 Inspect block for warp	X	X
10 Bore cylinders	X	X
11 Hone cylinders	X	X
12 Install cam bearings	X	X
13 Assemble short block	X	X
14 Check engine compression	X	X
15 Replace intake manifold	X	X
16 Inspect and replace exhaust manifold	X	X
17 Replace water manifold		X
18 Replace clutch assembly	X	X
19 Replace turboblower	X	X
20 Replace water pump	X	X
21 Replace cylinder heads	X	X
22 Rebuild water pump		X
23 Replace connecting rods and pistons	X	X
24 Replace sleeves		X
25 Replace vibration damper	X	X
26 Replace timing flow cover		X
27 Replace crankshaft assembly	X	X
28 Replace camshaft assembly	X	X
29 Replace oil seals	X	X
30 Replace freeze plugs	X	X

SERVICING CYLINDER HEADS AND VALVE TRAINS

	AM	DM
1 Inspect for rocker arm lubrication	X	X
2 Remove and replace intake manifold	X	X
3 Test valve lifters	X	X
4 Remove and replace cylinder head	X	X
5 Inspect cylinder head for warp or cracks	X	X
6 Rebuild cylinder head	X	X
7 Remove and replace harmonic balancer	X	X
8 Remove and replace timing chain or belt	X	X
9 Remove and replace timing gear	X	X
10 Remove and replace camshaft	X	X

	AM	DM
11 Remove and replace camshaft bearings	X	X
12 Adjust hydraulic valve lifters	X	X
13 Adjust mechanical valve lifters	X	X

SERVICING ELECTRICAL SYSTEMS

	AM	DM
1 Inspect battery electrolyte level	X	X
2 Test battery with hydrometer	X	X
3 Test battery for surface leakage	X	X
4 Test battery voltage	X	X
5 Test battery for capacity (load)	X	X
6 Clean battery, posts and cable connections	X	X
7 Measure ground system resistance	X	X
8 Remove and replace battery cables	X	X
9 Charge battery	X	X
10 Test charging system output	X	X
11 Test alternator output	X	X
12 Remove and replace generator or alternator	X	X
13 Rebuild generator	X	X
14 Rebuild alternator	X	X
15 Remove and replace charging system regulator	X	X
16 Test starter control circuit	X	X
17 Test starter current draw	X	X
18 Remove and replace starter solenoid	X	X
19 Test electrical motors	X	X
20 Remove and replace starter	X	X
21 Rebuild starter	X	X
22 Test switches	X	X
23 Remove and replace switches	X	X
24 Test fuses	X	X
25 Remove and replace fuses	X	X
26 Test circuit breakers	X	X
27 Remove and replace circuit breakers	X	X
28 Remove and replace fuse block assembly	X	X
29 Inspect lighting system for faulty bulbs	X	X
30 Remove and replace light bulbs	X	X
31 Remove and replace sockets	X	X
32 Adjust headlights	X	X
33 Test parking light circuit	X	X
34 Remove and replace dimmer switch	X	X
35 Test turn signal circuit	X	X
36 Remove and replace turn signal switch	X	X
37 Adjust backup light switch	X	X
38 Remove and replace backup light switch	X	X
39 Adjust stop light switch	X	X
40 Remove and replace stop light switch	X	X
41 Check horn circuit	X	X
42 Test horn relay	X	X
43 Remove and replace horn relay	X	X
44 Remove and replace horn	X	X
45 Test windshield wiper circuit	X	X
46 Remove and replace windshield wiper motor	X	X
47 Test constant voltage regulator	X	X
48 Remove and replace constant voltage regulator	X	X
49 Adjust voltage regulator output	X	X

	AM	DM
50 Test generator output	X	X
51 Test instrument gauges	X	X
52 Remove and replace instrument gauges	X	X
53 Test sending units	X	X
54 Remove and replace sending units	X	X
55 Test warning lamps	X	X
56 Remove and replace warning lamps	X	X
	X	X

SERVICING ELECTRICAL ACCESSORIES

	AM	DM
1 Test cruise control unit	X	
2 Remove and replace cruise control components	X	
3 Test automatic alarm system	X	
4 Remove and replace automatic alarm system components	X	
5 Test radio power circuit	X	X
6 Inspect radio speaker	X	X
7 Remove and replace radio speaker	X	X
8 Test radio antenna	X	X
9 Remove and replace radio antenna	X	X
10 Trim radio antenna	X	X
11 Remove and replace power antenna motor	X	
12 Remove and replace power window motors	X	X
13 Remove and replace power seat motors	X	
14 Test cigarette lighter circuit	X	X
15 Remove and replace cigarette lighter receptacle	X	X
16 Replace radio components	X	X
17 Repair windshield wipers	X	X
18 Test lighting systems	X	X
19 Test electrical shift mechanisms	X	X
20 Repair electrical shift mechanisms	X	X
21 Repair lighting system	X	X

SERVICING MANUAL TRANSMISSIONS

	AM	DM
1 Inspect and adjust shift linkage	X	X
2 Adjust manual clutch	X	X
3 Adjust hydraulic clutch free travel	X	X
4 Remove and replace extension housing seal and bushing	X	X
5 Remove and replace manual transmission	X	X
6 Rebuild manual transmission	X	X
7 Remove and replace pressure plate assembly	X	X
8 Remove and replace clutch release bearing	X	X
9 Remove and replace release fork	X	X
10 Remove and replace pilot bearing	X	X
11 Remove and replace hydraulic clutch slave cylinder	X	X
12 Rebuild hydraulic clutch slave cylinder	X	X
13 Remove and replace hydraulic clutch master cylinder	X	X
14 Rebuild hydraulic clutch master cylinder	X	X
15 Measure flywheel runout	X	X
16 Replace flywheel	X	X
17 Repair flywheel		X
18 Measure bellhousing runout	X	X
19 Remove and replace four wheel drive transfer case	X	
20 Rebuild four wheel drive transfer case	X	
21 Check fluid levels	X	X

SERVICING DRIVE LINES

		AM	DM
1	Inspect drive line for worn parts	X	X
2	Lubricate universal joint	X	X
3	Remove and replace universal joint	X	X
4	Remove and replace trunnion joint	X	X
5	Lubricate speedometer cable	X	X
6	Remove and replace speedometer cable	X	X
7	Remove and replace speedometer drive gear	X	X
8	Remove and replace axle seal	X	X
9	Remove and replace axle bearing	X	X
10	Balance drive shaft (in car)	X	
11	Remove and replace transmission mount	X	X
12	Check drive line angles	X	X
13	Remove and replace differential assembly (integral)	X	
14	Remove and replace differential assembly (removable)	X	X
15	Rebuild differential assembly (integral)	X	
16	Rebuild differential assembly (removable)	X	
17	Remove and replace transaxle assembly	X	
18	Rebuild transaxle assembly	X	
19	Remove and replace front-wheel-drive axle assemblies	X	
20	Rebuild four wheel drive locking hubs	X	
21	Remove and replace pinion seal	X	X
22	Rebuild power takeoff	X	X
23	Remove and replace drive shaft center support bearings	X	X
24	Rebuild constant velocity universal joints	X	
25	Remove and replace constant velocity joints	X	
26	Repack constant velocity joints	X	
27	Remove and replace constant velocity boots	X	

PERFORMING WELDING AND OXY-FUEL CUTTING

		AM	DM
1	Set up oxy-fuel welding and cutting equipment	X	X
2	Braze mild steel	X	X
3	Solder copper tubing	X	X
4	Cut mild steel with oxy-fuel equipment	X	X
5	Set up shielded metal arc welding equipment	X	X
6	Weld 3/16" mild steel in flat position	X	X
7	Weld 3/16" mild steel in horizontal position	X	X
8	Solder electrical components and wire	X	X
9	Heat metal parts to assist in removal	X	X
10	Weld cast iron	X	X
11	Braze cast iron	X	X

PERFORMING DIESEL ENGINE TUNE-UPS

		AM	DM
1	Test and adjust air inductor system	X	X
2	Test fuel system	X	X
3	Adjust injector timing	X	X
4	Adjust valve clearance	X	X
5	Adjust fuel pressure	X	X
6	Adjust control rack	X	X
7	Check and adjust linkage for full throttle operation	X	X

PERFORMING SAFETY PRACTICES

	AM	DM
1 Apply shop and equipment safety rules	X	X
2 Apply first aid procedures	X	X
3 Complete an accident report	X	X
4 Evaluate personnel safety violations	X	X
5 Inspect the workplace for safe working environment	X	X
6 Report shop safety violations	X	X
7 Correct safety violations	X	X
8 Participate in shop safety committee	X	X

PERFORMING PREVENTATIVE MAINTENANCE

	AM	DM
1 Perform underside inspections	X	X
2 Service crankcase lube	X	X
3 Service fuel filter	X	X
4 Perform underhood inspections	X	X
5 Complete lubrication operations	X	X
6 Service tires	X	X

PERFORM MAINTENANCE CONTROL FUNCTIONS

	AM	DM
1 Complete labor time cards	X	X
2 Complete requests for procurement of parts	X	X
3 Complete unsatisfactory reports	X	X
4 Enter work performed on work orders	X	X
5 Follow up on requisitions	X	X
6 Initiate and complete work order	X	X
7 Initiate request for parts	X	X
8 Maintain daily work control logs or status boards	X	X
9 Plan, schedule and control maintenance of vehicles	X	X
10 Prepare reports of vehicle defects	X	X
11 Spot check service orders	X	X

PERFORMING PRECISION MEASUREMENTS

	AM	DM
1 Measure parts using standard and metric measurement systems	X	X
2 Measure parts with steel rule	X	X
3 Measure parts using dial indicators	X	X
4 Measure parts using outside micrometers	X	X
5 Measure parts using inside micrometers	X	X
6 Measure parts using depth micrometers	X	X
7 Measure parts using special micrometers	X	X
8 Measure parts using inside and outside calipers	X	X
9 Measure threads	X	X
10 Calibrate precision measuring tools	X	X
11 Clean and store precision measuring tools	X	X

PERFORMING CHASSIS AND CAB MAINTENANCE

	AM	DM
1 Inspect fifth wheel and king pin		X
2 Inspect and service landing gears		X
3 Inspect and service slider tandem		X
4 Replace torque arms	X	X
5 Repair doors	X	X
6 Install windshield, back and side glass	X	X

		AM	DM
7	Inspect and service hood	X	X
8	Inspect and repair mirrors	X	X
9	Inspect and service ventilation system	X	X
10	Inspect and service seat	X	X

EMPLOYABILITY SKILLS

DUTY A: Identifying Employment Opportunities

SKILLS:
1 Identify requirements for job
2 Investigate educational opportunities
3 Investigate occupational opportunities
4 Locate resources for finding employment
5 Confer with prospective employers
6 Identify job trends

DUTY B: Applying Employment Seeking Skills

SKILLS:
1 Locate job openings
2 Document skills and abilities (resume)
3 Prepare for interview
4 Participate in interview
5 Complete required tests
6 Complete required forms
7 Write application letter
8 Write follow-up letter
9 Write acceptance letter
10 Evaluate job offer
11 Evaluate job rejection

DUTY C: Interpreting Employment Capabilities

SKILLS:
1 Match interest to job area
2 Match aptitudes to job area
3 Verify abilities
4 Identify immediate work goal
5 Develop career plan

DUTY D: Demonstrating Appropriate Work Behavior

SKILLS:
1 Exhibit dependability
2 Demonstrate punctuality
3 Follow rules and regulations
4 Recognize the consequences of dishonesty
5 Complete assignments in accurate and timely manner
6 Control emotions
7 Assume responsibility for own decisions and actions
8 Exhibit pride and loyalty
9 Exhibit ability to handle pressures and tensions
10 Demonstrate ability to set priorities
11 Demonstrate problem-solving skills

DUTY E: Maintaining Safe and Healthy Environment

SKILLS:
1 Comply with safety and health rules
2 Select correct tools and equipment
3 Utilize equipment correctly

4 Use appropriate action during emergencies
5 Maintain clean and orderly work area
6 Demonstrate personal hygiene and cleanliness

DUTY F: Maintaining Business-Like Image

SKILLS: 1 Participate in company or agency orientation
2 Demonstrate knowledge of company or agency products and services
3 Exhibit positive behavior
4 Read current job-related publications
5 Support and promote employer's company image and purpose
6 Maintain appearance to comply with company standards

DUTY G: Maintaining Working Relationships with Others

SKILLS: 1 Work productively with others
2 Show empathy, respect and support for others
3 Demonstrate procedures and assist others when necessary
4 Recognize, analyze and solve or refer problems
5 Minimize occurrence of problems
6 Channel emotional reaction constructively

DUTY H: Communicating on the Job

SKILLS: 1 Read and comprehend written communications and information
2 Use correct grammar
3 Speak effectively with others
4 Use job-related terminology
5 Listen attentively
6 Write legibly
7 Use telephone etiquette
8 Follow written and oral directions
9 Ask questions
10 Locate information in order to accomplish task
11 Prepare written communication
12 Utilize keyboarding skills
13 Utilize computer skills

DUTY I: Adapting to Change

SKILLS: 1 Recognize need to change
2 Demonstrate willingness to learn
3 Demonstrate flexibility
4 Participate in continuing education
5 Seek work challenges
6 Adjust career goals/plan as needed

DUTY J: Understanding How a Business Works

SKILLS:
1 Recognize the role of business in the enterprise system
2 Identify general responsibilities of employees
3 Identify general responsibilities of management/employers
4 Investigate opportunities and options for business ownership
5 Identify planning processes needed to open a business
6 Participate in meetings

DUTY K: Performing Mathematical Skills

SKILLS:
1 Apply mathematics for problem solving
2 Add and subtract whole numbers, decimals and fractions
3 Multiply and divide whole numbers, decimals and fractions
4 Convert numbers between forms expressed as fractions, decimals and percents
5 Convert between standard American units of measure
6 Convert between standard American units and metric units

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

DUTY A: Preparing New Vehicles

TASKS:
1 Adjust and lubricate door hinges and striker plates
2 Locate water leaks
3 Seal water leaks
4 Locate duct leaks
5 Seal duct leaks
6 Locate rattles and noises
7 Install door moldings
8 Remove and replace window regulators
9 Adjust window regulators
10 Install air shocks
11 Install C.B. and radios

DUTY B: Servicing Suspension Systems

TASKS:
1 Inspect suspension systems for worn parts
2 Remove and replace suspension bushings and king pins
3 Inspect tires and wheels for damage and irregular wear
4 Remove and replace front wheel bearings (drum brakes)
5 Remove and replace front wheel bearings (disc brakes)
6 Repack wheel bearings
7 Remove and replace shock absorbers
8 Remove and replace control arms
9 Remove and replace ball joints
10 Remove and replace torsion bars
11 Remove and replace coil springs
12 Remove and replace spindle
13 Remove and replace McPherson strut assembly
14 Rebuild McPherson strut assembly
15 Remove and replace trunnion pin assembly
16 Remove and replace leaf spring assembly
17 Remove and replace spring hangers
18 Remove and replace "I" beam
19 Remove and replace stabilizer and bushings
20 Replace idler arm
21 Replace pitman arm
22 Inspect torque arms
23 Replace torque arms
24 Inspect and adjust torsion bar
25 Inspect ball joints

DUTY C: Servicing Heating and Cooling System

TASKS:
1 Determine cause of overheating
2 Test thermal sensing switch
3 Remove and replace thermal sensing switch
4 Remove and replace drive belts
5 Test coolant freezing point
6 Install antifreeze
7 Inspect and replace water hoses
8 Check variable speed fan clutch
9 Remove and replace variable speed fan clutch
10 Remove and replace electric cooling fan motor

11 Chemically clean cooling system
12 Remove and replace thermostat
13 Test thermostat
14 Test coolant pressure caps
15 Pressure test cooling system
16 Remove and replace heater hoses
17 Remove and replace radiator hoses
18 Remove and replace radiator
19 Rebuild blower assembly on air-cooled engines
20 Remove and replace heater cores
21 Remove and replace water pump

DUTY D: Performing Steering and Wheel Services

TASKS:
1 Inspect steering gear and linkage for worn parts
2 Check and service fluid level
3 Lubricate steering gear and linkage
4 Test tire pressure
5 Rotate tires
6 Balance wheel and tire assembly
7 Adjust steering sector
8 Remove and replace steering linkage components
9 Remove and replace manual steering sector
10 Remove and replace steering damper
11 Remove and replace power steering hoses
12 Remove and replace belt(s) and set tension
13 Remove and replace power steering cylinder
14 Remove and replace power steering control valve assembly
15 Rebuild power steering control valve assembly
16 Remove and replace power steering pump
17 Rebuild rack and pinion power steering assembly
18 Rebuild rack and pinion manual steering assembly
19 Adjust toe-in
20 Align front end
21 Align rear wheels
22 Remove and replace turn signal switch
23 Remove and replace ignition switch rack
24 Remove and replace steering wheel
25 Remove and replace mast jacket
26 Set center line steering
27 Check steering axis inclination
28 Remove and replace tilt wheel and telescope
29 Remove and replace power steering seals
30 Remove and replace four-way switch
31 Rebuild steering column
32 Remove and replace steering column bearings, shift tube and socket
33 Remove and replace steering column
34 Replace shift detent in column
35 Remove and replace rack and pinion power steering assembly

DUTY E: Servicing Brake Systems

TASKS:
1 Check brake operation

2 Inspect brake hoses and lines
3 Flush brake system
4 Adjust brake shoes
5 Free up parking brake cable and linkage
6 Adjust parking brake linkage
7 Remove and replace parking brake cable and linkage
8 Remove and replace parking brake external band
9 Remove and replace brake shoes
10 Remove and replace self-adjusters
11 Remove and replace wheel cylinder
12 Rebuild wheel cylinder
13 Cam grind brake shoe
14 Grind (turn) brake drum
15 Recondition backing plate
16 Remove and replace disc brake rotor
17 Reface disc brake rotor
18 Remove and replace caliper assembly
19 Rebuild caliper assembly
20 Remove and replace master cylinder
21 Rebuild master cylinder
22 Remove and replace hydraulic power brake unit
23 Remove and replace hydrobrake booster unit
24 Bleed brake system
25 Remove and replace proportioning meter (combination valve)
26 Test brake antilock system
27 Replace defective components in brake antilock system
28 Test rotor parallelism
29 Test rotor runout
30 Torque wheel lug nuts
31 Check and service fluid level
32 Replace wheels
33 Repack wheel bearings
34 Replace hydraulic lines and hoses
35 Adjust air brakes

DUTY F: Servicing Emission Control Systems

TASKS: 1 Test emission control system using propane enrichment apparatus
2 Remove and replace vacuum hoses
3 Test positive crankcase ventilation system
4 Remove and replace positive crankcase ventilation valve
5 Remove and replace positive crankcase ventilation valve hose(s)
6 Test vacuum advance/retard device
7 Remove and replace vacuum advance/retard device
8 Test electrical advance/retard device
9 Check idle solenoid
10 Remove and replace idle solenoid
11 Remove and replace deceleration valve
12 Test thermostatic air cleaner
13 Adjust thermostatic air cleaner
14 Remove and replace thermostatic air cleaner
15 Check exhaust gas recirculation valve operation
16 Remove and replace exhaust gas recirculation valve

17 Check air injection system
18 Remove and replace air pump
19 Remove and repair diverter and anti-backfire valve
20 Test fuel evaporation system
21 Remove and replace closed system charcoal canister filter
22 Test back pressure of exhaust system
23 Remove and replace catalytic converter
24 Remove and replace beads in catalytic converter
25 Test exhaust oxygen sensor
26 Remove and replace exhaust oxygen sensor
27 Test electronic fuel mixture control system

DUTY G: Servicing Exhaust Systems

TASKS:
1 Check exhaust system for leaks and restrictions
2 Remove and replace exhaust system supports
3 Remove and replace converter beads
4 Remove and replace catalytic converter
5 Remove and replace muffler
6 Remove and replace exhaust pipe
7 Remove and replace tail pipe
8 Remove and replace exhaust manifold
9 Inspect exhaust system
10 Inspect exhaust manifold
11 Inspect turbocharger
12 Replace turbocharger
13 Rebuild turbocharger

DUTY H: Servicing Heating and Air-Conditioning Systems

TASKS:
1 Inspect control cables
2 Test electrical control circuits
3 Remove and replace compressor belts
4 Test vacuum components
5 Remove and replace vacuum components
6 Test air-conditioning thermal switch
7 Test blower motor
8 Remove and replace blower motor
9 Test thermostatic clutch switch
10 Remove and replace thermostatic clutch switch
11 Inspect air-conditioning magnetic clutch switch
12 Remove and replace air-conditioning magnetic clutch switch (piston type)
13 Inspect clutch and pulley assembly
14 Remove and replace clutch and hub assembly (rotary type)
15 Test air conditioner charge
16 Charge system using pound cans
17 Charge system using bulk source
18 Perform leak test with halide torch
19 Perform leak test with electronic tester
20 Remove and replace refrigerant lines
21 Fabricate refrigerant lines
22 Remove and replace compressor seals
23 Check compressor oil level

24 Inspect dryer
25 Remove and replace dryer in air-conditioning unit
26 Remove and replace condenser in air-conditioning unit
27 Remove and replace evaporator
28 Remove and replace metering orifice valve (expansion valve)
29 Test throttle-suctioning valve
30 Remove and replace throttle-suctioning valve
31 Test compressor reed plates
32 Remove and replace compressor reed plates
33 Remove and replace compressor
34 Rebuild rotary compressor (swash-plate)
35 Remove and replace heater core
36 Install air-conditioning system
37 Remove and replace low pressure cutout switch
38 Remove and replace high pressure cutout switch
39 Evacuate and charge refrigeration system
40 Check system for leaks
41 Replace refrigeration clutch
42 Inspect refrigeration controls
43 Repair refrigeration controls

DUTY I: Servicing Fuel Systems

TASKS:
1 Test carburetor adjustment using combustion analyzer
2 Test carburetor adjustment using infrared tester
3 Test carburetor adjustment using propane enrichment apparatus
4 Adjust carburetor idle mixture
5 Adjust antistall device
6 Inspect carburetor linkage for binding and worn parts
7 Check carburetor for vacuum leaks
8 Remove and replace carbureter air cleaner
9 Clean automatic choke
10 Adjust automatic choke
11 Free up manifold heat riser valve
12 Remove and replace manifold heat riser valve
13 Clean heat riser passages
14 Adjust float
15 Adjust carburetor metering rods
16 Remove and replace carburetor metering jets
17 Remove and replace carbureter
18 Rebuild carbureter
19 Remove and replace fuel filter unit
20 Test and adjust fuel pump
21 Remove and replace fuel pump
22 Test and adjust fuel injection system
23 Remove and replace electrical fuel injector computer
24 Test wiring harness of electronic fuel injection system
25 Remove and replace fuel injection nozzle
26 Rebuild fuel injection nozzle
27 Remove and replace fuel injection pump
28 Rebuild fuel injection pump
29 Check waste gate adjustment
30 Adjust waste gate adjustment
31 Remove and replace turbocharger

32 Rebuild turbocharger
33 Remove and replace fuel lines
34 Remove and replace fuel tank
35 Remove and replace fuel level sending unit
36 Test electronic fuel mixture control system
37 Time diesel engine injector pump
38 Remove and replace injector (diesel)
39 Remove and replace injector line (diesel)
40 Test injector spray pattern (diesel)
41 Test calibration of injector lines (diesel)
42 Bleed fuel system
43 Clean fuel filter
44 Check air cleaner element
45 Clean air cleaner element
46 Remove and replace wiring harness of electronic fuel system

DUTY J: Servicing Ignition Systems

TASKS: 1 Test engine using engine analyzer
2 Test point dwell
3 Remove and replace distributor cap
4 Remove and replace distributor rotor
5 Inspect distributor for worn parts
6 Remove and replace points
7 Remove and replace condenser
8 Test condenser
9 Remove and replace distributor
10 Rebuild distributor
11 Test control unit (electronic)
12 Remove and replace control unit (electronic)
13 Test pickup coil (electronic)
14 Remove and replace pickup coil (electronic)
15 Test automatic spark advance mechanism
16 Remove and replace spark advance mechanism
17 Adjust point dwell
18 Test ignition timing
19 Adjust ignition timing
20 Test ignition coil
21 Test primary circuit resistance
22 Test secondary circuit continuity
23 Test spark plug wire resistance
24 Remove and replace spark plug wires
25 Remove and replace spark plugs
26 Clean spark plugs
27 Gap spark plugs
28 Test glow plug electrical system
29 Test glow plug
30 Remove and replace glow plug
31 Test solenoid
32 Replace solenoid
33 Test distributor
34 Time distributor to engine
35 Test generator/alternator
36 Replace generator/alternator
37 Test regulator

38 Replace regulator

DUTY K: Servicing Automatic Transmissions

TASKS:
1 Pressure test transmission in vehicle
2 Stall test automatic transmission in vehicle
3 Clean transmission oil strainer
4 Remove and replace transmission oil filter
5 Adjust automatic transmission shift linkage
6 Test vacuum shift modulator
7 Remove and replace vacuum shift modulator
8 Adjust bands
9 Remove and replace transmission governor
10 Clean transmission governor
11 Clean transmission valve body
12 Remove and replace automatic transmission with convertor assembly
13 Remove and replace automatic transmission without convertor assembly
14 Rebuild automatic transmission assembly
15 Measure convertor turbine end play
16 Air pressure test transmission on bench
17 Pressure flush converter assembly
18 Pressure flush automatic transmission cooler assembly
19 Remove and replace torque converter
20 Remove and replace extension housing seal and bushing
21 Splice cooler lines
22 Replenish transmission oil
23 Test electrical controls of automatic clutch converter
24 Inspect and replace automatic transmission
25 Inspect and service drive shaft and U-joints
26 Replace U-joints
27 Replace single speed differential
28 Rebuild single speed differential
29 Replace axles and seals

DUTY L: Performing Engine Mechanical Diagnosis

TASKS:
1 Test cylinder balance using engine analyzer
2 Test cylinder leakage
3 Inspect engine for vacuum leaks
4 Inspect engine for oil leaks
5 Inspect to determine cause of overheating
6 Inspect cooling system for source of coolant loss
7 Inspect valve train and guides for cause of malfunctions
8 Inspect engine for source of mechanical engine noise

DUTY M: Servicing Engine Blocks

TASKS:
1 Steam clean engine
2 Test oil pump pressure
3 Test oil pressure relief valve
4 Remove and replace motor mounts

5 Remove and replace engine assembly
6 Remove and replace oil pan
7 Remove and replace rod bearing(s)
8 Remove and replace crankshaft
9 Inspect block for warp
10 Bore cylinders
11 Hone cylinders
12 Install cam bearings
13 Assemble short block
14 Check engine compression
15 Replace intake manifold
16 Inspect and replace exhaust manifold
17 Replace clutch assembly
18 Replace turboblower
19 Replace water pump
20 Replace cylinder heads
21 Replace connecting rods and pistons
22 Replace vibration damper
23 Replace crankshaft assembly
24 Replace camshaft assembly
25 Replace oil seals
26 Replace freeze plugs

DUTY N: Servicing Cylinder Heads and Valve Trains

Tasks: 1 Inspect for rocker arm lubrication
2 Remove and replace intake manifold
3 Test valve lifters
4 Remove and replace cylinder head
5 Inspect cylinder head for warp or cracks
6 Rebuild cylinder head
7 Remove and replace harmonic balancer
8 Remove and replace timing chain or belt
9 Remove and replace timing gear
10 Remove and replace camshaft
11 Remove and replace camshaft bearings
12 Adjust hydraulic valve lifters
13 Adjust mechanical valve lifters

DUTY O: Servicing Electrical Systems

TASKS: 1 Inspect battery electrolyte level
2 Test battery with hydrometer
3 Test battery for surface leakage
4 Test battery voltage
5 Test battery for capacity (load)
6 Clean battery, posts and cable connections
7 Measure ground system resistance
8 Remove and replace battery cables
9 Charge battery
10 Test charging system output
11 Test alternator output
12 Remove and replace generator or alternator
13 Rebuild generator

14 Rebuild alternator
15 Remove and replace charging system regulator
16 Test starter control circuit
17 Test starter current draw
18 Remove and replace starter solenoid
19 Test electrical motors
20 Remove and replace starter
21 Rebuild starter
22 Test switches
23 Remove and replace switches
24 Test fuses
25 Remove and replace fuses
26 Test circuit breakers
27 Remove and replace circuit breakers
28 Remove and replace fuse block assembly
29 Inspect lighting system for faulty bulbs
30 Remove and replace light bulbs
31 Remove and replace sockets
32 Adjust headlights
33 Test parking light circuit
34 Remove and replace dimmer switch
35 Test turn signal circuit
36 Remove and replace turn signal switch
37 Adjust backup light switch
38 Remove and replace backup light switch
39 Adjust stop light switch
40 Remove and replace stop light switch
41 Check horn circuit
42 Test horn relay
43 Remove and replace horn relay
44 Remove and replace horn
45 Test windshield wiper circuit
46 Remove and replace windshield wiper motor
47 Test constant voltage regulator
48 Remove and replace constant voltage regulator
49 Adjust voltage regulator output
50 Test generator output
51 Test instrument gauges
52 Remove and replace instrument gauges
53 Test sending units
54 Remove and replace sending units
55 Test warning lamps
56 Remove and replace warning lamps

DUTY P: Servicing Electrical Accessories

TASKS: 1 Test cruise control unit
2 Remove and replace cruise control components
3 Test automatic alarm system
4 Remove and replace automatic alarm system components
5 Test radio power circuit
6 Inspect radio speaker
7 Remove and replace radio speaker
8 Test radio antenna
9 Remove and replace radio antenna

10 Trim radio antenna
11 Remove and replace power antenna motor
12 Remove and replace power window motors
13 Remove and replace power seat motors
14 Test cigarette lighter circuit
15 Remove and replace cigarette lighter receptacle
16 Replace radio components
17 Repair windshield wipers
18 Test lighting systems
19 Test electrical shift mechanisms
20 Repair electrical shift mechanisms
21 Repair lighting system

DUTY Q: Servicing Manual Transmissions

TASKS:
1 Inspect and adjust shift linkage
2 Adjust manual clutch
3 Adjust hydraulic clutch free travel
4 Remove and replace extension housing seal and bushing
5 Remove and replace manual transmission
6 Rebuild manual transmission
7 Remove and replace pressure plate assembly
8 Remove and replace clutch release bearing
9 Remove and replace release fork
10 Remove and replace pilot bearing
11 Remove and replace hydraulic clutch slave cylinder
12 Rebuild hydraulic clutch slave cylinder
13 Remove and replace hydraulic clutch master cylinder
14 Rebuild hydraulic clutch master cylinder
15 Measure flywheel runout
16 Replace flywheel
17 Measure bellhousing runout
18 Remove and replace four-wheel-drive transfer case
19 Rebuild four-wheel-drive transfer case
20 Check fluid levels

DUTY R: Servicing Drive Lines

TASKS:
1 Inspect drive line for worn parts
2 Lubricate universal joint
3 Remove and replace universal joint
4 Remove and replace trunnion joint
5 Lubricate speedometer cable
6 Remove and replace speedometer cable
7 Remove and replace speedometer drive gear
8 Remove and replace axle seal
9 Remove and replace axle bearing
10 Balance drive shaft (in car)
11 Remove and replace transmission mount
12 Check drive line angles
13 Remove and replace differential assembly (integral)
14 Remove and replace differential assembly (removable)
15 Rebuild differential assembly (integral)
16 Rebuild differential assembly (removable)

17 Remove and replace transaxle assembly
18 Rebuild transaxle assembly
19 Remove and replace front-wheel-drive axle assemblies
20 Rebuild four-wheel-drive locking hubs
21 Remove and replace pinion seal
22 Rebuild power takeoff
23 Remove and replace drive shaft center support bearings
24 Rebuild constant velocity universal joints
25 Remove and replace constant velocity joints
26 Repack constant velocity joints
27 Remove and replace constant velocity boots

DUTY S: Performing Welding and Oxy-Fuel Cutting

TASKS: 1 Set up oxy-fuel welding and cutting equipment
2 Braze mild steel
3 Solder copper tubing
4 Cut mild steel with oxy-fuel equipment
5 Set up shielded metal arc welding equipment
6 Weld 3/16" mild steel in flat position
7 Weld 3/16" mild steel in horizontal position
8 Solder electrical components and wire
9 Heat metal parts to assist in removal
10 Weld cast iron
11 Braze cast iron

DUTY T: Performing Diesel Engine Tune-Ups

TASKS: 1 Test and adjust air inductor system
2 Test fuel system
3 Adjust injector timing
4 Adjust valve clearance
5 Adjust fuel pressure
6 Adjust control rack
7 Check and adjust linkage for full throttle operation

DUTY U: Performing Safety Practices

TASKS: 1 Apply shop and equipment safety rules
2 Apply first aid procedures
3 Complete an accident report
4 Evaluate personnel safety violations
5 Inspect the workplace for safe working environment
6 Report shop safety violations
7 Correct safety violations
8 Participate in shop safety committee

DUTY V: Performing Preventative Maintenance

TASKS: 1 Perform underside inspections
2 Service crankcase lube
3 Service fuel filter

4 Perform underhood inspections
5 Complete lubrication operations
6 Service tires

DUTY W: Perform Maintenance Control Functions

TASKS:
1 Complete labor time cards
2 Complete requests for procurement of parts
3 Complete unsatisfactory reports
4 Enter work performed on work orders
5 Follow up on requisitions
6 Initiate and complete work order
7 Initiate request for parts
8 Maintain daily work control logs or status boards
9 Plan, schedule and control maintenance of vehicles
10 Prepare reports of vehicle defects
11 Spot check service orders

DUTY X: Performing Precision Measurements

TASKS:
1 Measure parts using standard and metric measurement systems
2 Measure parts with steel rule
3 Measure parts using dial indicators
4 Measure parts using outside micrometers
5 Measure parts using inside micrometers
6 Measure parts using depth micrometers
7 Measure parts using special micrometers
8 Measure parts using inside and outside calipers
9 Measure threads
10 Calibrate precision measuring tools
11 Clean and store precision measuring tools

DUTY Y: Performing Chassis and Cab Maintenance

TASKS:
1 Replace torque arms
2 Repair doors
3 Install windshield, back and side glass
4 Inspect and service hood
5 Inspect and repair mirrors
6 Inspect and service ventilation system
7 Inspect and service seat

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

DUTY A: Preparing New Vehicles

TASKS:
1 Adjust and lubricate door hinges and striker plates
2 Locate water leaks
3 Seal water leaks
4 Locate duct leaks
5 Seal duct leaks
6 Remove and replace window regulators
7 Adjust window regulators
8 Install air shocks
9 Install C.B. and radios

DUTY B: Servicing Suspension Systems

TASKS:
1 Inspect suspension systems for worn parts
2 Remove and replace suspension bushings and king pins
3 Inspect tires and wheels for damage and irregular wear
4 Remove and replace front wheel bearings (drum brakes)
5 Remove and replace front wheel bearings (disc brakes)
6 Repack wheel bearings
7 Remove and replace shock absorbers
8 Remove and replace control arms
9 Remove and replace ball joints
10 Remove and replace torsion bars
11 Remove and replace coil springs
12 Remove and replace spindle
13 Remove and replace trunnion pin assembly
14 Remove and replace leaf spring assembly
15 Remove and replace spring hangers
16 Remove and replace "I" beam
17 Remove and replace stabilizer and bushings
18 Replace idler arm
19 Replace pitman arm
20 Inspect walking beams
21 Replace walking beams
22 Inspect torque arms
23 Replace torque arms
24 Inspect and adjust torsion bar
25 Inspect ball joints

DUTY C: Servicing Heating and Cooling Systems

TASKS:
1 Determine cause of overheating
2 Test thermal sensing switch
3 Remove and replace thermal sensing switch
4 Remove and replace drive belts
5 Test coolant freezing point
6 Install antifreeze
7 Inspect and replace water hoses
8 Check variable speed fan clutch
9 Remove and replace variable speed fan clutch
10 Remove and replace electric cooling fan motor
11 Chemically clean cooling system
12 Remove and replace thermostat

13 Test thermostat
14 Test coolant pressure caps
15 Pressure test cooling system
16 Remove and replace heater hoses
17 Remove and replace radiator hoses
18 Remove and replace radiator
19 Rebuild blower assembly on air-cooled engines
20 Remove and replace heater cores
21 Remove and replace water pump
22 Inspect shutter stat

DUTY D: Performing Steering and Wheel Services

TASKS: 1 Inspect steering gear and linkage for worn parts
2 Check and service fluid level
3 Lubricate steering gear and linkage
4 Test tire pressure
5 Balance wheel and tire assembly
6 Adjust steering sector
7 Remove and replace steering linkage components
8 Remove and replace manual steering sector
9 Remove and replace steering damper
10 Remove and replace power steering hoses
11 Remove and replace belt(s) and set tension
12 Remove and replace power steering cylinder
13 Remove and replace power steering control valve assembly
14 Rebuild power steering control valve assembly
15 Remove and replace power steering pump
16 Rebuild rack and pinion power steering assembly
17 Rebuild rack and pinion manual steering assembly
18 Adjust toe-in
19 Align front end
20 Align rear wheels
21 Remove and replace turn signal switch
22 Remove and replace ignition switch rack
23 Remove and replace steering wheel
24 Remove and replace mast jacket
25 Set center line steering
26 Check steering axis inclination
27 Remove and replace tilt wheel and telescope
28 Remove and replace power steering seals
29 Remove and replace four-way switch
30 Rebuild steering column
31 Remove and replace steering column bearings, shift tube and socket
32 Remove and replace steering column
33 Replace shift detent in column
34 Remove and replace rack and pinion power steering assembly

DUTY E: Servicing Brake Systems

TASKS: 1 Check brake operation
2 Inspect brake hoses and lines
3 Flush brake system

4 Adjust brake shoes
5 Remove and replace brake shoes
6 Remove and replace wheel cylinder
7 Rebuild wheel cylinder
8 Cam grind brake shoe
9 Grind (turn) brake drum
10 Recondition backing plate
11 Remove and replace disc brake rotor
12 Reface disc brake rotor
13 Remove and replace caliper assembly
14 Rebuild caliper assembly
15 Remove and replace master cylinder
16 Rebuild master cylinder
17 Remove and replace hydraulic power brake unit
18 Remove and replace hydrobrake booster unit
19 Bleed brake system
20 Remove and replace proportioning meter (combination valve)
21 Test brake antilock system
22 Replace defective components in brake antilock system
23 Test rotor parallelism
24 Test rotor runout
25 Torque wheel lug nuts
26 Check and service fluid level
27 Replace wheels
28 Repack wheel bearings
29 Replace hydraulic lines and hoses
30 Adjust air brakes
31 Inspect air valves
32 Replace air valves
33 Inspect compressor
34 Replace air compressor
35 Test air compressor governor
36 Replace air compressor governor
37 Inspect antiskid system
38 Inspect air chambers
39 Replace air chambers
40 Inspect parking brake chamber
41 Replace parking brake chamber
42 Test air system for leaks
43 Reline air brake
44 Replace air valves

DUTY F: Servicing Emission Control Systems

TASKS: 1 Remove and replace vacuum hoses
2 Test thermostatic air cleaner
3 Adjust thermostatic air cleaner
4 Remove and replace thermostatic air cleaner

DUTY G: Servicing Exhaust Systems

TASKS: 1 Check exhaust system for leaks and restrictions
2 Remove and replace exhaust system supports
3 Remove and replace muffler

4 Remove and replace exhaust pipe
5 Remove and replace tail pipe
6 Remove and replace exhaust manifold
7 Inspect exhaust system
8 Inspect exhaust manifold
9 Inspect turbocharger
10 Replace turbocharger
11 Rebuild turbocharger

DUTY H: Servicing Heating and Air-Conditioning Systems

TASKS:
1 Inspect control cables
2 Test electrical control circuits
3 Remove and replace compressor belts
4 Test vacuum components
5 Remove and replace vacuum components
6 Test air-conditioning thermal switch
7 Test blower motor
8 Remove and replace blower motor
9 Test thermostatic clutch switch
10 Remove and replace thermostatic clutch switch
11 Inspect air-conditioning magnetic clutch switch
12 Remove and replace air-conditioning magnetic clutch switch (piston type)
13 Inspect clutch and pulley assembly
14 Remove and replace clutch and hub assembly (rotary type)
15 Test air conditioner charge
16 Charge system using pound cans
17 Charge system using bulk source
18 Perform leak test with halide torch
19 Perform leak test with electronic tester
20 Remove and replace refrigerant lines
21 Fabricate refrigerant lines
22 Remove and replace compressor seals
23 Check compressor oil level
24 Inspect dryer
25 Remove and replace dryer in air-conditioning unit
26 Remove and replace condenser in air-conditioning unit
27 Remove and replace evaporator
28 Remove and replace metering orifice valve (expansion valve)
29 Test throttle-suctioning valve
30 Remove and replace throttle-suctioning valve
31 Test compressor reed plates
32 Remove and replace compressor reed plates
33 Remove and replace compressor
34 Rebuild rotary compressor (swash-plate)
35 Remove and replace heater core
36 Install air-conditioning system
37 Remove and replace low pressure cutout switch
38 Remove and replace high pressure cutout switch
39 Evacuate and charge refrigeration system
40 Check system for leaks
41 Replace refrigeration clutch
42 Inspect refrigeration controls
43 Repair refrigeration controls

DUTY I: Servicing Fuel Systems

TASKS:
1 Remove and replace fuel filter unit
2 Test and adjust fuel pump
3 Remove and replace fuel pump
4 Test and adjust fuel injection system
5 Remove and replace fuel injection nozzle
6 Rebuild fuel injection nozzle
7 Remove and replace fuel injection pump
8 Rebuild fuel injection pump
9 Check waste gate adjustment
10 Adjust waste gate adjustment
11 Remove and replace turbocharger
12 Rebuild turbocharger
13 Remove and replace fuel lines
14 Remove and replace fuel tank
15 Remove and replace fuel level sending unit
16 Test electronic fuel mixture control system
17 Time diesel engine injector pump
18 Remove and replace injector (diesel)
19 Remove and replace injector line (diesel)
20 Test injector spray pattern (diesel)
21 Test calibration of injector lines (diesel)
22 Bleed fuel system
23 Clean fuel filter
24 Check air cleaner element
25 Clean air cleaner element

DUTY J: Servicing Ignition Systems

TASKS:
1 Test glow plug electrical system
2 Test glow plug
3 Remove and replace glow plug
4 Test solenoid
5 Replace solenoid
6 Test generator/alternator
7 Replace generator/alternator
8 Test regulator
9 Replace regulator

DUTY K: Servicing Automatic Transmissions

TASKS:
1 Pressure test transmission in vehicle
2 Stall test automatic transmission in vehicle
3 Clean transmission oil strainer
4 Remove and replace transmission oil filter
5 Adjust automatic transmission shift linkage
6 Test vacuum shift modulator
7 Remove and replace vacuum shift modulator
8 Adjust bands
9 Remove and replace transmission governor
10 Clean transmission governor

11 Clean transmission valve body
12 Remove and replace automatic transmission with convertor assembly
13 Remove and replace automatic transmission without convertor assembly
14 Rebuild automatic transmission assembly
15 Measure convertor turbine end play
16 Air pressure test transmission on bench
17 Pressure flush convertor assembly
18 Pressure flush automatic transmission cooler assembly
19 Remove and replace torque convertor
20 Remove and replace extension housing seal and bushing
21 Splice cooler lines
22 Replenish transmission oil
23 Test electrical controls of automatic clutch convertor
24 Inspect and replace automatic transmission
25 Inspect and service drive shaft and U-joints
26 Replace U-joints
27 Replace single speed differential
28 Rebuild single speed differential
29 Replace two-speed differential
30 Rebuild shift unit
31 Replace power divider
32 Rebuild power divider
33 Replace axles and seals
34 Replace power takeoff

DUTY L: Performing Engine Mechanical Diagnosis

TASKS:
1 Test cylinder leakage
2 Inspect engine for vacuum leaks
3 Inspect engine for oil leaks
4 Inspect to determine cause of overheating
5 Inspect cooling system for source of coolant loss
6 Inspect valve train and guides for cause of malfunctions
7 Inspect engine for source of mechanical engine noise

DUTY M: Servicing Engine Blocks

TASKS:
1 Steam clean engine
2 Test oil pump pressure
3 Test oil pressure relief valve
4 Remove and replace motor mounts
5 Remove and replace engine assembly
6 Remove and replace oil pan
7 Remove and replace rod bearing(s)
8 Remove and replace crankshaft
9 Inspect block for warp
10 Bore cylinders
11 Hone cylinders
12 Install cam bearings
13 Assemble short block
14 Check engine compression
15 Replace intake manifold

16 Inspect and replace exhaust manifold
17 Replace water manifold
18 Replace clutch assembly
19 Replace turboblower
20 Replace water pump
21 Replace cylinder heads
22 Rebuild water pump
23 Replace connecting rods and pistons
24 Replace sleeves
25 Replace vibration damper
26 Replace timing flow cover
27 Replace crankshaft assembly
28 Replace camshaft assembly
29 Replace oil seals
30 Replace freeze plugs

DUTY N: Servicing Cylinder Heads and Valve Trains

TASKS:
1 Inspect for rocker arm lubrication
2 Remove and replace intake manifold
3 Test valve lifters
4 Remove and replace cylinder head
5 Inspect cylinder head for warp or cracks
6 Rebuild cylinder head
7 Remove and replace harmonic balancer
8 Remove and replace timing chain or belt
9 Remove and replace timing gear
10 Remove and replace camshaft
11 Remove and replace camshaft bearings
12 Adjust hydraulic valve lifters
13 Adjust mechanical valve lifters

DUTY O: Servicing Electrical Systems

TASKS:
1 Inspect battery electrolyte level
2 Test battery with hydrometer
3 Test battery for surface leakage
4 Test battery voltage
5 Test battery for capacity (load)
6 Clean battery, posts and cable connections
7 Measure ground system resistance
8 Remove and replace battery cables
9 Charge battery
10 Test charging system output
11 Test alternator output
12 Remove and replace generator or alternator
13 Rebuild generator
14 Rebuild alternator
15 Remove and replace charging system regulator
16 Test starter control circuit
17 Test starter current draw
18 Remove and replace starter solenoid
19 Test electrical motors
20 Remove and replace starter

21 Rebuild starter
22 Test switches
23 Remove and replace switches
24 Test fuses
25 Remove and replace fuses
26 Test circuit breakers
27 Remove and replace circuit breakers
28 Remove and replace fuse block assembly
29 Inspect lighting system for faulty bulbs
30 Remove and replace light bulbs
31 Remove and replace sockets
32 Adjust headlights
33 Test parking light circuit
34 Remove and replace dimmer switch
35 Test turn signal circuit
36 Remove and replace turn signal switch
37 Adjust backup light switch
38 Remove and replace backup light switch
39 Adjust stop light switch
40 Remove and replace stop light switch
41 Check horn circuit
42 Test horn relay
43 Remove and replace horn relay
44 Remove and replace horn
45 Test windshield wiper circuit
46 Remove and replace windshield wiper motor
47 Test constant voltage regulator
48 Remove and replace constant voltage regulator
49 Adjust voltage regulator output
50 Test generator output
51 Test instrument gauges
52 Remove and replace instrument gauges
53 Test sending units
54 Remove and replace sending units
55 Test warning lamps
56 Remove and replace warning lamps

DUTY P: Servicing Electrical Accessories

TASKS: 1 Test radio power circuit
2 Inspect radio speaker
3 Remove and replace radio speaker
4 Test radio antenna
5 Remove and replace radio antenna
6 Trim radio antenna
7 Remove and replace power window motors
8 Test cigarette lighter circuit
9 Remove and replace cigarette lighter receptacle
10 Replace radio components
11 Repair windshield wipers
12 Test lighting systems
13 Test electrical shift mechanisms
14 Repair electrical shift mechanisms
15 Repair lighting system

DUTY Q: Servicing Manual Transmissions

TASKS:
1 Inspect and adjust shift linkage
2 Adjust manual clutch
3 Adjust hydraulic clutch free travel
4 Remove and replace extension housing seal and bushing
5 Remove and replace manual transmission
6 Rebuild manual transmission
7 Remove and replace pressure plate assembly
8 Remove and replace clutch release bearing
9 Remove and replace release fork
10 Remove and replace pilot bearing
11 Remove and replace hydraulic clutch slave cylinder
12 Rebuild hydraulic clutch slave cylinder
13 Remove and replace hydraulic clutch master cylinder
14 Rebuild hydraulic clutch master cylinder
15 Measure flywheel runout
16 Replace flywheel
17 Repair flywheel
18 Measure bellhousing runout
19 Check fluid levels

DUTY R: Servicing Drive Lines

TASKS:
1 Inspect drive line for worn parts
2 Lubricate universal joint
3 Remove and replace universal joint
4 Remove and replace trunnion joint
5 Lubricate speedometer cable
6 Remove and replace speedometer cable
7 Remove and replace speedometer drive gear
8 Remove and replace axle seal
9 Remove and replace axle bearing
10 Remove and replace transmission mount
11 Check drive line angles
12 Remove and replace differential assembly (removable)
13 Remove and replace pinion seal
14 Rebuild power takeoff
15 Remove and replace drive shaft center support bearings

DUTY S: Performing Welding and Oxy-Fuel Cutting

TASKS:
1 Set up oxy-fuel welding and cutting equipment
2 Braze mild steel
3 Solder copper tubing
4 Cut mild steel with oxy-fuel equipment
5 Set up shielded metal arc welding equipment
6 Weld 3/16" mild steel in flat position
7 Weld 3/16" mild steel in horizontal position
8 Solder electrical components and wire
9 Heat metal parts to assist in removal
10 Weld cast iron
11 Braze cast iron

DUTY T: Performing Diesel Engine Tune-Ups

TASKS:
1 Test and adjust air inductor system
2 Test fuel system
3 Adjust injector timing
4 Adjust valve clearance
5 Adjust fuel pressure
6 Adjust control rack
7 Check and adjust linkage for full throttle operation

DUTY U: Performing Safety Practices

TASKS:
1 Apply shop and equipment safety rules
2 Apply first aid procedures
3 Complete an accident report
4 Evaluate personnel safety violations
5 Inspect the workplace for safe working environment
6 Report shop safety violations
7 Correct safety violations
8 Participate in shop safety committee

DUTY V: Performing Preventative Maintenance

TASKS:
1 Perform underside inspections
2 Service crankcase lube
3 Service fuel filter
4 Perform underhood inspections
5 Complete lubrication operations
6 Service tires

DUTY W: Perform Maintenance Control Functions

TASKS:
1 Complete labor time cards
2 Complete requests for procurement of parts
3 Complete unsatisfactory reports
4 Enter work performed on work orders
5 Follow up on requisitions
6 Initiate and complete work order
7 Initiate request for parts
8 Maintain daily work control logs or status boards
9 Plan, schedule and control maintenance of vehicles
10 Prepare reports of vehicle defects
11 Spot check service orders

DUTY X: Performing Precision Measurements

TASKS:
1 Measure parts using standard and metric measurement systems
2 Measure parts with steel rule
3 Measure parts using dial indicators
4 Measure parts using outside micrometers

5 Measure parts using inside micrometers
6 Measure parts using depth micrometers
7 Measure parts using special micrometers
8 Measure parts using inside and outside calipers
9 Measure threads
10 Calibrate precision measuring tools
11 Clean and store precision measuring tools

DUTY Y: Performing Chassis and Cab Maintenance

TASKS:
1 Inspect fifth wheel and king pin
2 Inspect and service landing gears
3 Inspect and service slider tandem
4 Replace torque arms
5 Repair doors
6 Install windshield, back and side glass
7 Inspect and service hood
8 Inspect and repair mirrors
9 Inspect and service ventilation system
10 Inspect and service seat

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

Education For Employment Task Lists

Illinois State Board of Education

Adult Vocational and Technical Education

INDUSTRIAL OCCUPATIONS

MANUFACTURING CLUSTER

Machine Tool Operator
Machinist
Tool and Die Maker
Punch Press Operator
Sheet Metal Worker
Combination Welder
Maintenance Repairer
Automated Manufacturing Systems Technician
*Employability Skills

*Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

MT = Machine Tool Operator
M = Machinist
TD = Tool and Die Maker
PP = Punch Press Operator
SM = Sheet Metal Worker
CW = Combination Welder
MR = Maintenance Repairer
AM = Automated Manufacturing Systems Technician

APPLYING SAFETY PRACTICES

	MT	M	TD	PP	SM	CW	MR	AM
1 Comply with shop and equipment safety rules	X	X	X	X	X	X	X	X
2 Apply basic emergency first aid techniques	X	X	X	X	X	X	X	X
3 Complete accident report	X	X	X	X	X	X	X	X
4 Inspect work area and equipment for safe working environment	X	X	X	X	X	X	X	X
5 Report shop, environmental and equipment safety violations	X	X	X	X	X	X	X	X
6 Demonstrate use of fire extinguishers	X	X	X	X	X	X	X	X
7 Participate in disaster control exercises	X	X	X	X		X	X	X
8 Participate in shop safety committee	X	X	X	X		X	X	X
9 Correct safety hazards	X	X	X	X	X	X	X	X
10 Demonstrate cardiopulmonary resuscitation (CPR) techniques	X	X	X	X	X	X	X	X
11 Comply with safety requirements for working around automated systems	X	X	X	X		X	X	X
12 Participate in safety training program	X	X	X	X	X	X	X	X
13 Conduct safety training program		X	X					X

PERFORMING BENCHWORK OPERATIONS

	MT	M	TD	PP	SM	CW	MR	AM
1 Cut threads with taps and dies	X	X	X				X	X
2 Remove threaded fasteners and repair threads	X	X	X				X	X
3 Deburr parts	X	X	X		X		X	X
4 Polish parts using coated abrasives	X	X	X				X	X
5 Sharpen and polish tools using abrasive stones	X	X	X				X	X
6 Rough finish parts with hand filing machines						X		X
7 Rough grind parts with hand grinders						X	X	X
8 Finish parts with hand grinders		X	X			X	X	X
9 Determine high spots using pigment		X	X				X	X
10 Remove high spots		X	X				X	X
11 Polish and buff parts with portable hand tools		X	X				X	X
12 Lap and fit parts		X	X				X	X
13 Scrape friction surfaces			X				X	X
14 Disassemble, assemble and straighten parts using arbor press	X	X	X			X	X	X
15 Cut keyway with broach	X	X	X				X	X
16 Set up and use hone to apply specified surface in hole	X	X	X					
17 Disassemble, fit and reassemble parts	X	X	X	X	X	X	X	X
18 Lift and position workpiece using hoists	X	X	X	X		X	X	X
19 Assemble jigs and fixtures		X	X					
20 Repair jigs and fixtures		X	X					
21 Fit and assemble metalworking dies			X					

	MT	M	TD	PP	SM	CW	MR	AM
22 Repair metalworking dies			X					
23 Assemble cutting tools			X					
24 Repair cutting tools			X					
25 Assemble gages			X					
26 Repair gages			X					
27 Repair handtools			X					
28 Plan assembly operations		X	X		X	X	X	
29 Supervise assembly operations		X	X					
30 Work materials with hand tools	X	X	X	X	X	X	X	X
31 Work materials with portable power tools	X	X	X		X	X	X	X
32 Bend metal with box and pan brake					X	X		
33 Bend sheet metal with cornice brake					X			
34 Bend metal with power brake					X	X		
35 Cut metal with power shear					X	X		
36 Notch materials					X	X		
37 Roll cylindrical metal shapes					X	X		
38 Chip slag						X		
39 Work materials with hydraulic iron worker					X	X		
40 Bevel pipe						X		
41 Position materials to be welded with positioners						X		
42 Position weldments						X		

PERFORMING PRECISION MEASUREMENT

	MT	M	TD	PP	SM	CW	MR	AM
1 Measure parts with semi-precision measuring tools	X	X	X	X	X	X	X	X
2 Inspect parts with precision measuring tools	X	X	X	X	X	X	X	X
3 Inspect parts with comparison measuring tools	X	X	X	X	X	X	X	X
4 Inspect parts using go/no go gages	X	X	X	X				
5 Measure parts using dial calipers	X	X	X	X				
6 Measure parts using vernier measuring tools	X	X	X	X				
7 Measure parts using outside micrometers	X	X	X	X				
8 Measure parts using inside micrometers	X	X	X	X				
9 Measure parts using depth micrometers	X	X	X	X				
10 Measure parts using special micrometers		X	X	X				
11 Measure parts using telescoping gages	X	X	X					
12 Measure parts using small hole gages	X	X	X					
13 Measure parts using bore gages	X	X	X					
14 Inspect parts using radius gages	X	X	X					
15 Set up and inspect parts using dial indicators	X	X	X	X			X	X
16 Measure parts using optical comparators	X	X	X	X				
17 Measure parts with height gage	X	X	X	X				
18 Measure angles using sine bar		X	X					
19 Measure angles, arcs and locations from reference point		X	X					
20 Measure threads	X	X	X				X	X
21 Measure tapers	X	X	X				X	X
22 Inspect keyways	X	X	X				X	X
23 Measure gears	X	X	X				X	X
24 Inspect surface finish of parts	X	X	X				X	X
25 Calibrate and use indicating micrometers		X	X					
26 Calibrate precision measuring tools	X	X	X				X	X

	MT	M	TD	PP	SM	CW	MR	AM
27 Measure parts using mechanical measuring tools		X	X	X				
28 Measure parts using electronic measuring tools		X	X	X				
29 Measure parts using special measuring tools		X	X	X				
30 Clean and store precision measuring tools	X	X	X	X		X	X	X
31 Perform first piece inspection		X	X	X				
32 Inspect parts according to quality control inspection standards and procedures	X	X 	 X	X		X		
33 Monitor reports of discrepancy or rejects during production process		X	X	X		X		
34 Conduct quality tests under differing environmental conditions	X	X	X	X		X		
35 Verify dimensions		X	X				X	X
36 Verify alignments		X	X				X	X
37 Verify clearances		X	X				X	X
38 Inspect machined parts	X	X	X				X	X
39 Inspect assemblies		X	X		X	X	X	X
40 Inspect parts with metric measuring instruments	X	X	X	X	X	X	X	X

PERFORMING LAYOUTS

	MT	M	TD	PP	SM	CW	MR	AM
1 Analyze specifications	X	X	X		X	X	X	X
2 Compute layout dimensions	X	X	X		X	X	X	X
3 Plan layout operations	X	X	X		X	X	X	X
4 Calculate reference points		X	X		X	X	X	X
5 Calculate angles from reference point		X	X		X	X	X	X
6 Calculate arcs from reference point		X	X		X	X	X	X
7 Calculate locations from reference point		X	X		X	X	X	X
8 Verify workpiece specifications		X	X		X	X	X	X
9 Lay out reference points		X	X		X	X	X	X
10 Lay out angles, arcs and locations from reference point		X	X		X	X	X	X
11 Label workpiece	X	X	X		X	X	X	X
12 Perform semi-precision layouts	X	X	X		X	X	X	X
13 Perform precision layouts from blueprints	X	X	X			X	X	X
14 Perform sheet metal layouts from blueprints					X			
15 Perform layouts from templates					X	X		
16 Transfer layouts from models		X			X			
17 Perform pipe layouts						X		
18 Verify layouts		X	X		X	X	X	X
19 Supervise layout operations		X	X			X		

OPERATING SAWS

	MT	M	TD	PP	SM	CW	MR	AM
1 Remove and replace saw blades	X	X	X			X		
2 Cut and weld bandsaw blades	X	X	X			X		
3 Calculate and set cutting speed and feed rate for sawing	X	X	X			X		
4 Saw straight, curved and irregular lines on vertical band saws	X	X	X			X		
5 Saw material to layout with vertical band saw	X	X	X			X		

	MT	M	TD	PP	SM	CW	MR	AM
6 Set up and use vertical band saw for interior contour sawing	X	X	X					
7 Set up and use vertical band saw to file parts	X	X	X					
8 Cut straight lines on vertical band saw using automatic feed	X	X	X					
9 Cut angles on vertical band saw by tilting table	X	X	X					
10 Set up and use jigs and fixtures for special sawing operations	X	X	X					
11 Slot, groove, miter and trim parts on saw	X	X	X			X		
12 Set up and use stops and guides to control dimension of cuts	X	X	X			X		
13 Set up and use automatic bar feed mechanism for production work	X	X						
14 Set up and use horizontal band saw for production work	X	X				X		
15 Set up and use power hack saw for production work	X	X				X		
16 Set up and use circular saw for production work	X	X				X		
17 Set up and use friction saw for production work	X	X				X		
18 Set up and use rubber disk saw for production work	X	X				X		
19 Use and maintain coolant system for sawing	X	X	X			X		
20 Perform basic saw maintenance	X	X	X			X		
21 Plan sequence of sawing operations		X	X			X		

OPERATING DRILLING MACHINES

	MT	M	TD	PP	SM	CW	MR	AM
1 Select drills using drill chart	X	X	X		X	X		
2 Use and maintain coolant system for drilling	X	X	X		X	X		
3 Change drills and tool holders	X	X	X		X	X		
4 Calculate and set drilling speeds, feeds and depth of cut		X	X		X	X		
5 Align workpiece, jigs and fixtures with drill spindle		X	X					
6 Align tools with drill guide bushings	X	X	X					
7 Center drill and drill holes to size	X	X	X		X	X		
8 Countersink, counterbore and spot face parts to specifications	X	X	X					
9 Drill blind holes to specifications	X	X	X					
10 Drill deep holes to specifications	X	X	X					
11 Drill holes to specifications using special drills	X	X	X					
12 Thread parts using tapping attachment	X	X	X					
13 Ream holes to size	X	X	X					
14 Burnish parts to specifications	X	X	X					
15 Drill holes at an angle by tilting head or table	X	X	X					
16 Position spindle over hole location by swinging radial arm		X	X					
17 Sharpen drills		X	X					

	MT	M	TD	PP	SM	CW	MR	AM
18 Perform basic drilling machine maintenance	X	X	X		X	X		
19 Plan sequence of drilling operations		X	X		X	X		
20 Set up drill press		X	X		X	X		
21 Set up radial drill to drill large workpieces		X	X					
22 Set up precision drills		X	X					
23 Set up special drilling machines		X	X					

OPERATING BENCH GRINDERS

	MT	M	TD	PP	SM	CW	MR	AM
1 Change and dress bench grinding wheels	X	X	X		X	X		
2 Sharpen and recondition hand tools	X	X	X		X	X		
3 Grind lathe turning tools		X	X					
4 Grind lathe form tools		X	X					
5 Grind lathe threading tools		X	X					
6 Grind lathe cut-off tools		X	X					
7 Grind lathe boring tools		X	X					
8 Sharpen carbide tools		X	X					
9 Rough grind materials					X	X		
10 Perform basic bench grinder maintenance	X	X	X		X	X		

OPERATING LATHES

	MT	M	TD	PP	SM	CW	MR	AM
1 Calculate and set lathe speeds, feeds and depth of cut		X	X					
2 Use and maintain coolant system on lathe	X	X	X					
3 Face and turn parts in 3-jaw chuck	X	X	X					
4 Machine parts between centers	X	X	X					
5 Indicate and machine parts in 4-jaw chuck	X	X	X					
6 Machine parts using collet chucks	X	X	X					
7 Machine parts using faceplate	X	X	X					
8 Perform forming operations	X	X	X					
9 Perform knurling operations	X	X	X					
10 Center drill and drill parts	X	X	X					
11 Bore, face and recess internal diameters	X	X	X					
12 Ream holes to specifications	X	X	X					
13 Undercut diameters and shoulders	X	X	X					
14 Machine eccentric diameters	X	X	X					
15 Manufacture springs	X	X	X					
16 Cut off parts	X	X	X					
17 Align lathe centers		X	X					
18 Calculate tapers		X	X					
19 Turn tapers	X	X	X					
20 Machine internal tapers	X	X	X					
21 Thread external diameters	X	X	X					
22 Thread internal diameters	X	X	X					
23 Repair threads	X	X	X					
24 Cut special thread forms		X	X					
25 Hold dimensions using feed, precision and indicator stops on lathe	X	X	X					
26 Hold dimensions using digital readout on lathe	X	X	X					
27 Machine parts using carbide tooling	X	X	X					
28 Machine parts using ceramic tooling	X	X	X					
29 Machine parts using steady rest	X	X	X					

	MT	M	TD	PP	SM	CW	MR	AM
30 Machine long parts using follower rest	X	X	X					
31 Machine parts using jigs and fixtures	X	X	X					
32 Machine radii	X	X	X					
33 Duplicate parts using tracing attachment	X	X	X					
34 Grind parts using tool post grinder	X	X	X					
35 Machine parts using quick change tooling system	X	X	X					
36 Identify machining problems, determine causes and correct problems		X	X					
37 Perform basic lathe maintenance	X	X	X					
38 Plan sequence of lathe operations		X	X					
39 Set up engine lathe		X	X					
40 Set up high speed lathe for secondary operations		X	X					
41 Set up bar turret lathe for production work		X						
42 Set up chucking lathe for production work		X						

OPERATING VERTICAL MILLING MACHINES

	MT	M	TD	PP	SM	CW	MR	AM
1 Calculate and set speeds, feeds and depth of cut for vertical mill		X	X					
2 Align vertical milling machine head		X	X					
3 Align workpiece, work holding devices, jigs and fixtures on vertical mill		X	X					
4 Use and maintain coolant system on milling machine	X	X	X					
5 Change tool holders and cutters on vertical mill		X	X					
6 Establish zero reference point on workpiece to be machined		X	X					
7 Hold dimensions using table and precision stops on vertical mill	X	X	X					
8 Hold dimensions using digital readout on vertical mill	X	X	X					
9 Machine parts using end milling cutters on vertical mill	X	X	X					
10 Machine parts using carbide milling cutters on vertical mill	X	X	X					
11 Machine parts using ceramic milling cutters on vertical mill	X	X	X					
12 Machine parts using conventional and climb milling on vertical mill	X	X	X					
13 Machine parts square on vertical mill	X	X	X					
14 Machine closed pockets on vertical mill	X	X	X					
15 Machine angles on vertical mill	X	X	X					
16 Machine radii using form milling cutter on vertical mill	X	X	X					
17 Machine keyways on vertical mill	X	X	X					
18 Machine "T" slots on vertical mill	X	X	X					
19 Machine dovetails on vertical mill	X	X	X					
20 Center drill, drill and ream holes on vertical mill	X	X	X					
21 Tap holes on vertical mill	X	X	X					
22 Bore, face and recess diameters using boring head	X	X	X					

	MT	M	TD	PP	SM	CW	MR	AM
23 Set up and use jigs and fixtures on vertical mill	X	X	X					
24 Solve indexing problems		X	X					
25 Mill multiple surfaces using indexing fixture on vertical mill	X	X	X					
26 Mill multiple surfaces using dividing head on vertical mill	X	X	X					
27 Mill radii using rotary table	X	X	X					
28 Drill hole patterns using rotary table	X	X	X					
29 Mill angles using rotary table	X	X	X					
30 Duplicate contours using tracing attachment	X	X	X					
31 Identify milling problems, determine causes and correct problems		X	X					
32 Perform basic vertical milling machine maintenance	X	X	X					
33 Plan sequence of vertical milling operations		X	X					
34 Set up vertical milling machine for manual operations		X	X					
35 Set up vertical milling machine for automatic operations		X	X					

OPERATING HORIZONTAL MILLING MACHINES

	MT	M	TD	PP	SM	CW	MR	AM
1 Calculate and set milling speeds, feeds and depth of cut for horizontal mill		X	X					
2 Align workpiece, work holding devices, jigs and fixtures on horizontal mill		X	X					
3 Change arbors and cutters on horizontal mill		X	X					
4 Hold dimensions using table and precision stops on horizontal mill	X	X	X					
5 Hold dimensions using digital readouts on horizontal mill	X	X	X					
6 Machine parts using conventional and climb milling on horizontal mill	X	X	X					
7 Machine parts using carbide insert cutters on horizontal mill	X	X	X					
8 Machine parts using ceramic cutting tools on horizontal mill	X	X	X					
9 Perform slab milling	X	X	X					
10 Perform gang milling	X	X	X					
11 Perform straddle milling	X	X	X					
12 Mill parts square using horizontal mill	X	X	X					
13 Mill angles on horizontal mill	X	X	X					
14 Machine keyways on horizontal mill	X	X	X					
15 Machine deep slots on horizontal mill	X	X	X					
16 Cut off parts using horizontal mill	X	X	X					
17 Perform gear calculations		X	X					
18 Machine gears on horizontal mill using dividing head	X	X	X					
19 Machine splines on horizontal mill using dividing head	X	X	X					
20 Machine rack on horizontal mill	X	X	X					
21 Machine multiple surfaces using indexing fixture on horizontal mill	X	X	X					

	MT	M	TD	PP	SM	CW	MR	AM
22 Perform basic horizontal milling machine maintenance	X	X	X					
23 Plan sequence of horizontal milling operations		X	X					
24 Set up horizontal milling machine for manual operations		X	X					
25 Set up horizontal milling machine for automatic operations		X	X					

OPERATING BORING MACHINES

	MT	M	TD	PP	SM	CW	MR	AM
1 Calculate and set speeds, feeds and depth of cut on boring machine		X	X					
2 Align workpiece, work holding devices, jigs and fixtures on boring machine		X	X					
3 Use and maintain coolant system on boring machine	X	X	X					
4 Change cutters and tool holders on boring machine		X	X					
5 Hold dimensions using table and precision stops on boring machine	X	X	X					
6 Hold dimensions using digital readout on boring machine	X	X	X					
7 Establish zero reference point on workpiece		X	X					
8 Center drill, drill and ream holes on boring machine	X	X	X					
9 Countersink, counterbore and spot face holes on boring machine	X	X	X					
10 Tap holes on boring machine	X	X	X					
11 Bore, face and recess internal surfaces on boring machine	X	X	X					
12 Machine external surfaces on boring machine	X	X	X					
13 Identify boring machine problems, determine causes and solve problems		X	X					
14 Perform basic boring machine maintenance	X	X	X					
15 Plan sequence of boring machine operations		X	X					
16 Set up boring machine for manual operations		X	X					
17 Set up boring machine for automatic operations		X	X					

OPERATING SURFACE GRINDERS

	MT	M	TD	PP	SM	CW	MR	AM
1 Select grinding wheel using manufacturers' wheel data charts		X	X					
2 Inspect, mount and dress surface grinding wheels		X	X					
3 Calculate and set surface grinding feeds and depth of cut		X	X					
4 Maintain grinding coolant system	X	X	X					
5 Grind parallel surfaces on surface grinder	X	X	X					
6 Grind parts square on surface grinder	X	X	X					
7 Grind vertical surface on surface grinder	X	X	X					
8 Grind angles on surface grinder	X	X	X					
9 Grind radii on surface grinder	X	X	X					

	MT	M	TD	PP	SM	CW	MR	AM
10 Grind profiles on surface grinder	X	X	X					
11 Remove warp using surface grinder	X	X	X					
12 Cut off parts on surface grinder	X	X	X					
13 Inspect ground parts	X	X	X					
14 Perform basic surface grinder maintenance	X	X	X					
15 Plan sequence of surface grinder operations		X	X					
16 Set up surface grinder for manual operations		X	X					
17 Set up surface grinder for automatic operations		X	X					

OPERATING INSIDE DIAMETER (I.D.) GRINDERS

	MT	M	TD	PP	SM	CW	MR	AM
1 Inspect, mount and dress I.D. grinding wheels		X	X					
2 Calculate and set I.D. grinding speeds, feeds and depth of cut		X	X					
3 Parallel grind inside diameters	X	X	X					
4 Grind to internal shoulder	X	X	X					
5 Grind internal taper	X	X	X					
6 Grind internal radius	X	X	X					
7 Grind internal recess	X	X	X					
8 Grind internal angle	X	X	X					
9 Face grind internal shoulder	X	X	X					
10 Grind blind hole	X	X	X					
11 Grind through parts		X	X					
12 Inspect inside diameters of ground parts	X	X	X					
13 Perform basic I.D. grinder maintenance	X	X	X					
14 Plan sequence of I.D. grinder operations		X	X					
15 Set up I.D. grinder for manual operations		X	X					
16 Set up I.D. grinder for automatic operations		X	X					

OPERATING OUTSIDE DIAMETER (O.D.) GRINDERS

	MT	M	TD	PP	SM	CW	MR	AM
1 Inspect, mount and dress O.D. grinding wheels		X	X					
2 Calculate and set O.D. grinding speeds, feeds and depth of cut		X	X					
3 Align O.D. grinder head, table and fixtures		X	X					
4 Parallel grind outside diameters on O.D. grinder	X	X	X					
5 Grind to external shoulder on O.D. grinder	X	X	X					
6 Grind external taper on O.D. grinder	X	X	X					
7 Grind external radius on O.D. grinder	X	X	X					
8 Grind external angle on O.D. grinder	X	X	X					
9 Plunge grind external diameter on O.D. grinder	X	X	X					
10 Grind parts between centers	X	X	X					
11 Grind parts using collet chucks	X	X	X					
12 Grind parts using other work holding devices	X	X	X					
13 Grind parts using steady rest	X	X	X					
14 Grind parts using follower rest	X	X	X					

	MT	M	TD	PP	SM	CW	MR	AM
15 Grind complex profile on O.D. grinder	X	X	X					
16 Inspect outside diameters of parts ground on O.D. grinder	X	X	X					
17 Perform basic O.D. grinder maintenance	X	X	X					
18 Plan sequence of O.D. grinder operations		X	X					
19 Set up O.D. grinder for manual operations		X	X					
20 Set up O.D. grinder for automatic operations		X	X					

OPERATING CENTERLESS GRINDERS

	MT	M	TD	PP	SM	CW	MR	AM
1 Inspect, mount and balance centerless grinding wheels		X	X					
2 Dress centerless grinding wheels and regulating wheels		X	X					
3 Calculate and set centerless grinding speeds, feeds and depth of cut		X	X					
4 Parallel grind outside diameters on centerless grinder	X	X	X					
5 Grind to external shoulder on centerless grinder	X	X	X					
6 Grind external taper on centerless grinder	X	X	X					
7 Grind external radius on centerless grinder	X	X	X					
8 Grind external angle on centerless grinder	X	X	X					
9 Plunge grind external diameter on centerless grinder	X	X	X					
10 Plunge grind complex profile on centerless grinder		X	X					
11 Inspect outside diameters of parts ground on centerless grinder	X	X	X					
12 Perform basic centerless grinder maintenance	X	X	X					
13 Plan sequence of centerless grinder operations		X	X					
14 Set up centerless grinder		X	X					

OPERATING TOOL AND CUTTER GRINDERS

	MT	M	TD	PP	SM	CW	MR	AM
1 Select, inspect, mount and dress wheels on tool and cutter grinder		X	X					
2 Align workhead and work holding devices on tool and cutter grinder		X	X					
3 Calculate and set speeds, feeds and depth of cut on tool and cutter grinder		X	X					
4 Grind plain milling cutters		X	X					
5 Grind staggered tooth milling cutters		X	X					
6 Grind form relieved milling cutters		X	X					
7 Grind end mills		X	X					
8 Grind helical milling cutters		X	X					
9 Grind angular milling cutters		X	X					
10 Sharpen drills		X	X					
11 Grind step drills		X	X					
12 Grind straight reamers		X	X					
13 Grind tapered reamers		X	X					
14 Grind taps		X	X					
15 Grind set of thread chasers		X	X					
16 Grind boring bars		X	X					

	MT	M	TD	PP	SM	CW	MR	AM
17 Grind lathe turning tools		X	X					
18 Grind lathe form tools		X	X					
19 Grind complex profiles		X	X					
20 Grind carbide tools and cutters		X	X					
21 Inspect cutter clearance angles		X	X					
22 Identify grinding problems, determine causes and solve problems		X	X					
23 Perform basic tool and cutter grinder maintenance		X	X					
24 Plan sequence of tool and cutter grinder operations		X	X					
25 Set up tool and cutter grinder for manual operations		X	X					
26 Set up tool and cutter grinder for automatic operations		X	X					

OPERATING JIG GRINDERS

	MT	M	TD	PP	SM	CW	MR	AM
1 Select, inspect, mount and dress wheels on jib grinder			X					
2 Calculate and set speeds, feeds and depth of cut on jig grinder			X					
3 Set diameter of planetary action			X					
4 Set limits of automatic reciprocating wheel feed			X					
5 Establish zero reference point on workpiece			X					
6 Indicate work under spindle center on jig grinder			X					
7 Grind holes on jig grinder			X					
8 Grind contours on jig grinder			X					
9 Set spindle angle for taper grinding			X					
10 Grind tapers on jig grinder			X					
11 Perform basic jig grinder maintenance			X					
12 Plan sequence of jig grinder operations			X					
13 Set up jig grinder			X					

OPERATING ELECTRICAL DISCHARGE MACHINES (EDM)

	MT	M	TD	PP	SM	CW	MR	AM
1 Machine EDM electrodes to job specifications		X	X					
2 Mount EDM electrodes in holder		X	X					
3 Position workpiece on table or fixture		X	X					
4 Align work and check for clearance		X	X					
5 Calculate and set feed rate and depth of cut		X	X					
6 Select electrical discharge circuit		X	X					
7 Select method for using dilective fluid		X	X					
8 Perform internal rough and finish cuts	X	X	X					
9 Perform external rough and finish cuts	X	X	X					
10 Perform profile rough and finish cuts	X	X	X					
11 Perform repair work	X	X	X					
12 Inspect parts machined with EDM	X	X	X					
13 Identify EDM problems, determine the causes and solve problems		X	X					
14 Perform basic EDM maintenance	X	X	X					
15 Plan sequence of EDM operations		X	X					

	MT	M	TD	PP	SM	CW	MR	AM
16 Set up wire EDM machine		X	X					
17 Set up electrical discharge machine		X	X					
18 Set up and operate portable EDM machine		X	X					

SELECTING MATERIALS

	MT	M	TD	PP	SM	CW	MR	AM
1 Interpret color codes, numbering systems, and classification systems of materials (ie. AISI, SAE)		X	X		X	X	X	X
2 Select material for job		X	X	X	X	X	X	X
3 Identify metals using spark test		X	X			X		X
4 Identify metals using variety of tests		X	X					X
5 Identify materials		X	X	X	X	X	X	X

PERFORMING HEAT TREATMENT OF METALS

	MT	M	TD	PP	SM	CW	MR	AM
1 Test hardness of metals		X	X					
2 Perform non-destructive testing		X	X					
3 Perform destructive testing		X	X					
4 Harden metals to job specifications		X	X			X		
5 Temper metals to job specifications		X	X			X		
6 Anneal metals to job specifications		X	X			X		
7 Normalize metals to job specifications		X	X			X		
8 Case harden metals to job specifications		X	X			X		
9 Preheat and post-heat metals to control distortion/warpage during welding						X		

PERFORMING HOUSEKEEPING AND RECORDKEEPING ACTIVITIES

	MT	M	TD	PP	SM	CW	MR	AM
1 Dispose of scrap metal chips, shavings, trash and waste	X	X	X	X	X	X	X	
2 Clean and maintain work area and leave in safe condition	X	X	X	X	X	X	X	X
3 Clean and store hand tools, cutters, fixtures, jigs and attachments	X	X	X	X	X	X	X	X
4 Store grinding wheels	X	X	X				X	
5 Follow tool crib procedures	X	X	X	X	X	X	X	X
6 Inspect and remove, replace, or adjust machine guards	X	X	X	X		X	X	
7 Scrape and paint machines	X	X		X			X	
8 Report problems to supervisor	X	X	X	X	X	X	X	X
9 Complete time cards	X	X	X	X	X	X	X	X
10 Complete job status reports	X	X	X	X	X	X	X	X
11 Make equipment failure reports	X	X	X	X	X	X	X	X
12 Record preventive maintenance activities			X				X	X
13 Record repair activities			X				X	X
14 Read job orders and process sheets to determine tooling and set up information		X	X	X		X	X	X
15 Determine basic maintenance procedures using manuals	X	X	X	X	X	X	X	X
16 Participate in participative management program (Quality Circles)	X	X	X	X	X	X	X	X

PERFORMING SUPERVISORY FUNCTIONS

	MT	M	TD	PP	SM	CW	MR	AM
1 Determine availability of machines, supplies and materials		X	X	X	X		X	X
2 Requisition, schedule and distribute supplies and materials		X	X		X		X	X
3 Select most productive machine tool and tooling for job		X	X	X	X		X	X
4 Coordinate workers with work to be done		X	X	X	X		X	X
5 Write work schedules		X	X	X	X		X	X
6 Schedule and control shop flow of jobs		X	X	X	X		X	X
7 Maintain files		X	X	X	X		X	X
8 Maintain production records		X	X	X	X		X	X
9 Maintain labor records		X	X	X	X		X	X
10 Maintain warranty records			X				X	X
11 Review job orders, process sheets and blueprint specifications		X	X	X	X		X	X
12 Issue blueprints, job orders, process sheets and tooling		X	X	X	X		X	X
13 Explain work requirements		X	X	X	X		X	X
14 Write production and progress reports		X	X	X	X		X	X
15 Write technical reports		X	X	X	X		X	X
16 Inventory supplies and equipment		X	X	X	X		X	X
17 Maintain charts, tables, graphs or status boards on work scheduled		X	X	X	X		X	X
18 Submit parts for first piece inspection		X	X	X				X
19 Conduct in process inspections		X	X	X				X
20 Monitor reports of discrepancy or rejects during production process		X	X	X				X
21 Follow up on end product quality control standards		X	X	X				X
22 Initiate engineering change notices and rejection reports		X	X	X			X	X
23 Write requests for deviation to specifications		X	X	X			X	X
24 Check job/time cards		X	X	X	X		X	X
25 Supervise machine use		X	X	X			X	X
26 Inspect shop equipment and arrange for maintenance and repair work		X	X	X	X		X	X
27 Prepare preventive maintenance schedule							X	X
28 Evaluate preventive maintenance program							X	X
29 Coordinate maintenance and repair of shop equipment		X	X	X	X		X	X
30 Prepare repair schedule							X	X
31 Observe maintenance and repair activities							X	X
32 Evaluate repair activities							X	X
33 Plan and implement technical training for employees		X	X	X	X		X	X
34 Train employees to operate mechanical devices		X	X	X	X		X	X
35 Evaluate employee progress and performance		X	X	X	X		X	X
36 Follow up employee reports of problems or equipment failures		X	X	X	X		X	X
37 Interview job applicants		X	X				X	X
38 Hire workers		X	X					
39 Dismiss employees		X	X	X				
40 Determine work to be done by outside firm		X	X					
41 Write contract for work with outside firm		X	X					

		MT	M	TD	PP	SM	CW	MR	AM
42	Conduct meetings		X	X					X
43	Estimate cost of equipment installation							X	X
44	Estimate cost of system installation							X	X
45	Estimate cost of repairs and downtime							X	X
46	Supervise assembly operations								X

SETTING UP NUMERICAL CONTROL/COMPUTER NUMERICAL CONTROL (NC/CNC) MACHINES

		MT	M	TD	PP	SM	CW	MR	AM
1	Read job orders and process sheets to determine tooling and setup information		X	X					
2	Mount work holding device		X	X					
3	Install cutting tools in holders		X	X					
4	Mount holder and tool on spindle		X	X					
5	Insert tools and holders in machine magazine		X	X					
6	Load tools in tool drum		X	X					
7	Load automatic tool changer		X	X					
8	Load tools in turret		X	X					
9	Operate drawbar		X	X					
10	Dial cutter compensation		X	X					
11	Mount workpiece		X	X					
12	Position and secure stock in work holding device		X	X					
13	Place control tape in reader of control console		X	X					
14	Load program in computer		X	X					
15	Index cutting tool to zero point		X	X					
16	Set controls to operating position and start machine		X	X					
17	Dry run machine with machine locked		X	X					
18	Run machine in manual/jog mode to verify cutter path		X	X					
19	Machine first piece to verify accuracy of setup		X	X					
20	Machine first piece to verify accuracy of program		X	X					
21	Change cutting tools		X	X					
22	Change location of clamps and fixtures		X	X					
23	Reposition stock on fixture		X	X					
24	Observe machine operation		X	X					
25	Verify accuracy of machined workpiece		X	X					
26	Adjust speeds and feeds for maximum output		X	X					
27	Identify programming errors		X	X					
28	Update programs stored in bubble memory		X	X					
29	Notify supervisor of program errors		X	X					
30	Identify machine malfunctions		X	X					
31	Correct minor machine malfunctions		X	X					
32	Notify supervisor of machine malfunctions		X	X					
33	Verify workpiece detail identification number		X	X					
34	Verify type of material of workpiece		X	X					
35	Notify supervisor of discrepancies in parts		X	X					
36	Complete machine tool safety setup		X	X					
37	Establish tolerance requirement		X	X					
38	Inspect first piece to verify setup		X	X					

OPERATING NUMERICAL CONTROL/COMPUTER NUMERICAL CONTROL (NC/CNC) MACHINES

		MT	M	TD	PP	SM	CW	MR	AM
1	Turn on/off power		X	X					
2	Call up program in distributed numerical control		X	X					
3	Place tape in reader		X	X					
4	Key in program on machine		X	X					
5	Align holding device with machine axis		X	X					
6	Clamp dial indicator to tool holder		X	X					
7	Change tool holder		X	X					
8	Change or replace cutting tool		X	X					
9	Adjust tool offset manually		X	X					
10	Interpret operator related messages on screen		X	X					
11	Control spindle speed override		X	X					
12	Control feedrate override		X	X					
13	Activate automatic cycle mode		X	X					
14	Interrupt automatic cycle mode manually		X	X					
15	Set manual mode control		X	X					
16	Select cycle modifiers		X	X					
17	Select manual feed/jog mode		X	X					
18	Adjust cutter compensation		X	X					
19	Edit program		X	X					
20	Run segment of program		X	X					
21	Perform sequence search		X	X					
22	Interpret status lights		X	X					
23	Change spindle speed		X	X					
24	Initiate program restart from zero		X	X					
25	Interrupt cycle		X	X					
26	Check cutting fluids		X	X					
27	Check surface finish		X	X					
28	Check cut dimension		X	X					
29	Index turret		X	X					
30	Differentiate between machine controls		X	X					
31	Set cycle dwell		X	X					
32	Modify manual data input program		X	X					
33	Adjust depth of cut		X	X					
34	Reset tool cycle time		X	X					
35	Execute emergency stop		X	X					
36	Perform milling operations on NC/CNC machine		X	X					
37	Perform drilling operations on NC/CNC machine		X	X					
38	Perform boring operations on NC/CNC machine		X	X					
39	Perform reaming operations on NC/CNC machine		X	X					
40	Perform broaching operations on NC/CNC machine		X	X					
41	Perform turning operations on NC/CNC machine		X	X					
42	Perform forming operations on NC/CNC machine		X	X					
43	Perform punching operations on NC/CNC machine		X	X					
44	Perform welding operations with NC/CNC machine		X	X					

	MT	M	TD	PP	SM	CW	MR	AM
45 Perform painting operations with NC/CNC machine		X	X					
46 Perform assembly operations with NC/CNC machine		X	X					

SETTING UP MANUAL PUNCH PRESSES

	MT	M	TD	PP	SM	CW	MR	AM
1 Strip press of previous tooling				X				
2 Clean press				X				
3 Review setup sheet and specifications				X				
4 Set up die for change over				X				
5 Install die in press				X				
6 Align die in press				X				
7 Bolt die in press				X				
8 Adjust ram stroke to specifications				X				
9 Mount and align fixtures to press				X				
10 Set material stops				X				
11 Set up air ejectors				X				
12 Inspect and replace guards				X				
13 Set controls to operating position and start press				X				
14 Run press in manual/jog mode to verify clearances				X				
15 Position workpiece in press				X				
16 Adjust workpiece stops and supports				X				
17 Position parts containers				X				
18 Position scrap containers				X				
19 Run first piece to verify setup and conformance to specifications				X				
20 Make necessary adjustments to correct errors				X				
21 Give operator instructions				X				

OPERATING MANUAL PUNCH PRESSES

	MT	M	TD	PP	SM	CW	MR	AM
1 Place workpiece against stops				X				
2 Place workpiece in fixture				X				
3 Place workpiece in die				X				
4 Operate press				X				
5 Remove part				X				
6 Remove scrap materials				X				
7 Load and move parts containers				X				
8 Count and label parts				X				

SETTING UP AND OPERATING AUTOMATIC PUNCH PRESSES

	MT	M	TD	PP	SM	CW	MR	AM
1 Strip press of previous tooling				X				
2 Clean press				X				
3 Review setup sheet and specifications				X				
4 Install die in press				X				
5 Align die in press				X				
6 Bolt die in press				X				
7 Adjust ram stroke to specifications				X				
8 Mount and align fixtures to press				X				
9 Set material stops				X				
10 Mount form slides				X				

	MT	M	TD	PP	SM	CW	MR	AM
11 Set cams				X				
12 Set up air ejectors				X				
13 Inspect and replace guards				X				
14 Set controls to operating position and start press				X				
15 Run press in manual/jog mode to verify clearances				X				
16 Install parts chutes				X				
17 Position parts containers				X				
18 Position scrap containers				X				
19 Run first piece to verify setup and conformance to specifications				X				
20 Make necessary adjustments to correct errors				X				
21 Start run				X				
22 Input control panel data				X				
23 Monitor control panel data				X				
24 Interpret control panel data				X				

FASTENING AND/OR JOINING SHEET METAL

	MT	M	TD	PP	SM	CW	MR	AM
1 Rivet sheet metal with tinners rivets					X			
2 Rivet sheet metal with pop rivets					X			
3 Fasten materials using sheet metal screws					X			

FABRICATING SHEET METAL

	MT	M	TD	PP	SM	CW	MR	AM
1 Construct single hem					X			
2 Construct double hem					X			
3 Construct single lap seam					X			
4 Construct double lap seam					X			
5 Construct standing seam (air duct connections)					X			
6 Contruct Pittsburgh lock seam					X			
7 Construct grooved seam					X			
8 Construct drive clip (air duct connection)					X			
9 Construct S-cleat (air duct connection)					X			
10 Fabricate rectangular straight duct					X			
11 Fabricate rectangular radius throat and radius heel duct elbow					X			
12 Fabricate rectangular square throat and square heel duct elbow					X			
13 Fabricate rectangular duct ogee offset					X			
14 Fabricate rectangular duct transition					X			
15 Fabricate rectangular shoe tap					X			
16 Fabricate round straight duct					X			
17 Fabricate round duct elbow					X			
18 Fabricate round duct offset					X			
19 Fabricate round duct taper (transition)					X			
20 Fabricate single wall equipment casing/housing					X			
21 Fabricate double wall equipment casing/housing					X			
22 Fabricate companion angle					X			
23 Fabricate flanged duct section					X			

FABRICATING ARCHITECTURAL/ROOFING SHEET METAL

	MT	M	TD	PP	SM	CW	MR	AM
1 Fabricate ogee gutter					X			
2 Fabricate flashing					X			
3 Fabricate roof coping					X			
4 Fabricate gravel stop fascia					X			
5 Fabricate metal siding panel					X			
6 Fabricate column cover					X			
7 Fabricate metal ceiling panel					X			

FABRICATING SPECIALTY SHEET METAL

	MT	M	TD	PP	SM	CW	MR	AM
1 Fabricate rectangular single blade damper in frame					X			
2 Fabricate rectangular multi-blade damper in frame					X			
3 Fabricate rectangular tube					X			
4 Fabricate round tube					X			
5 Fabricate belt guard					X			
6 Fabricate breeching					X			
7 Fabricate rectangular fiberglass duct					X			
8 Fabricate lagging for insulated breeching					X			

FABRICATING FOOD AND BEVERAGE DISPENSING EQUIPMENT

	MT	M	TD	PP	SM	CW	MR	AM
1 Fabricate sink					X			
2 Fabricate shelf					X			
3 Fabricate cabinet shell					X			
4 Fabricate cabinet drawer					X			
5 Fabricate cabinet sliding door					X			
6 Fabricate cabinet hinge door					X			
7 Assemble cabinet components					X			
8 Fabricate range hood					X			

INSTALLING SHEET METAL SYSTEMS

	MT	M	TD	PP	SM	CW	MR	AM
1 Install rectangular duct system					X			
2 Install round duct system					X			
3 Install single wall equipment casing/ housing					X			
4 Install double wall equipment casing/ housing					X			
5 Install breeching					X			
6 Install belt guards					X			
7 Install ogee gutter					X			
8 Install flashing					X			
9 Install coping					X			
10 Install gravel stop fascia					X			
11 Install louver					X			

PERFORMING OXY-FUEL WELDING (OAW)

	MT	M	TD	PP	SM	CW	MR	AM
1 Select oxy-fuel (OAW) welding gas and filler metal according to job					X	X		
2 Change cylinders and adjust oxy-fuel manifold					X	X		

	MT	M	TD	PP	SM	CW	MR	AM
3 Set up portable oxy-acetylene welding equipment					X	X		
4 Perform minor maintenance on oxy-acetylene welding equipment (OAW)					X	X		
5 Weld 1/8" mild steel in flat position (1F,1G)						X		
6 Weld 1/8" mild steel in horizontal position (2F,2G)						X		
7 Weld 1/8" mild steel in vertical position (3F,3G)						X		
8 Weld 1/8" mild steel in overhead position (4F,4G)						X		
9 Braze ferrous metals					X	X		
10 Braze non-ferrous metals					X	X		
11 Silver braze ferrous metals						X		
12 Silver braze non-ferrous metals						X		
13 Heat and bend metal to specifications						X		
14 Heat metal parts to assist in removal						X		
15 Build up surfaces						X		
16 Hard face surfaces						X		
17 Solder copper					X			
18 Solder stainless steel					X			
19 Solder materials					X			

PERFORMING THERMAL CUTTING OPERATIONS

	MT	M	TD	PP	SM	CW	MR	AM
1 Set up portable oxy-fuel cutting equipment						X		
2 Cut steel by hand using oxy-fuel cutting equipment						X		
3 Cut cast iron by hand using oxy-fuel cutting equipment						X		
4 Cut steel with trackcutter using oxy-fuel cutting equipment						X		
5 Cut steel with pipecutter using oxy-fuel cutting equipment						X		
6 Set up pattern cutter						X		
7 Cut steel with single torch pattern cutter						X		
8 Cut steel with multiple torch pattern cutter						X		
9 Set up automatic shape cutter with photocell						X		
10 Cut steel with single torch automatic shape cutter with photocell						X		
11 Cut steel with multiple torch automatic shape cutter with photocell						X		
12 Set up and cut shapes with digital controlled shape cutter (with tape)						X		
13 Set up and cut shapes with digital controlled shape cutter (without tape)						X		
14 Cut and pierce metal with shielded metal arc welding equipment (SMAW)						X		
15 Set up air carbon arc equipment						X		
16 Cut carbon steel with air carbon arc equipment						X		
17 Cut stainless steel with air carbon arc equipment						X		
18 Cut aluminum with air carbon arc equipment						X		
19 Set up plasma arc cutting equipment (PAC)						X		

	MT	M	TD	PP	SM	CW	MR	AM
20 Cut metals by hand using plasma arc cutting equipment (PAC)						X		
21 Cut metals automatically using plasma arc cutting equipment (PAC)						X		

PERFORMING SHIELDED METAL ARC WELDING (SMAW)

	MT	M	TD	PP	SM	CW	MR	AM
1 Select shielded metal arc welding (SMAW) equipment and electrodes according to job					X	X		
2 Set up shielded metal arc welding equipment					X	X		
3 Perform minor maintenance on shielded metal arc welding equipment					X	X		
4 Weld 3/16" mild steel in flat position (1F,1G)					X	X		
5 Weld 3/16" mild steel in horizontal position (2F,2G)					X	X		
6 Weld 3/16" mild steel in vertical up/down positions (3F,3G)					X	X		
7 Weld 3/16" mild steel in overhead position (4F,4G)						X		
8 Weld single vee-groove butt joint on 3/8" steel plate (1G,4G)						X		
9 Weld double vee-groove butt joint on 1" steel plate (1G,4G)						X		
10 Weld 8" schedule 40 steel pipe in the 1G position						X		
11 Weld 8" schedule 40 steel pipe in the 2G position						X		
12 Weld 8" schedule 40 steel pipe in the 5G position						X		
13 Weld 8" schedule 40 steel pipe in the 6G position						X		
14 Weld 8" schedule 60 steel pipe in the 1G position						X		
15 Weld 8" schedule 60 steel pipe in the 2G position						X		
16 Weld 8" schedule 60 steel pipe in the 5G position						X		
17 Weld 8" schedule 60 steel pipe in 6G position						X		
18 Weld 8" schedule 60 steel pipe in 1F position						X		
19 Weld 8" schedule 60 steel pipe in 2F position						X		
20 Weld 8" schedule 60 steel pipe in 2FR position						X		
21 Weld 8" schedule 60 steel pipe in 4F position						X		
22 Weld 8" schedule 60 steel pipe in 5F position						X		
23 Weld 8" schedule 40S stainless steel pipe in 6G position						X		
24 Perform stud welding using Nelson method (electric arc/flux/ferrule)						X		

	MT	M	TD	PP	SM	CW	MR	AM
25 Weld stainless steel with shielded metal arc welding equipment (SMAW)					X	X		

PERFORMING GAS METAL ARC WELDING (GMAW)

	MT	M	TD	PP	SM	CW	MR	AM
1 Select gas metal arc welding (GMAW) equipment, filler metal and gases according to job					X	X		
2 Set up gas metal arc welding equipment					X	X		
3 Perform minor maintenance on gas metal arc welding equipment					X	X		
4 Weld 3/16" mild steel in flat position (1F,1G)					X	X		
5 Weld 3/16" mild steel in horizontal position (2F,2G)					X	X		
6 Weld 3/16" mild steel in vertical up/down positions (3F, 3G)					X	X		
7 Weld 3/16" mild steel in overhead position (4F,4G)						X		
8 Weld single vee-groove butt joint on 3/8" steel plate (1G,4G)						X		
9 Weld double vee-groove butt joint on 1" steel plate (1G,4G)						X		
10 Weld 8" schedule 40 steel pipe in 1G position						X		
11 Weld 8" schedule 40 steel pipe in 2G position						X		
12 Weld 8" schedule 40 steel pipe in 5G position						X		
13 Weld 8" schedule 40 steel pipe in 6G position						X		
14 Weld 8" schedule 60 steel pipe in 1G position						X		
15 Weld 8" schedule 60 steel pipe in 2G position						X		
16 Weld 8" schedule 60 steel pipe in 5G position						X		
17 Weld 8" schedule 60 steel pipe in 6G position						X		
18 Weld 8" schedule 60 steel pipe in 1F position						X		
19 Weld 8" schedule 60 steel pipe in 2F position						X		
20 Weld 8" schedule 60 steel pipe in 2FR position						X		
21 Weld 8" schedule 60 steel pipe in 4F position						X		
22 Weld 8" schedule 60 steel pipe in 5F position						X		
23 Weld 8" schedule 40S stainless steel pipe in 6G position						X		
24 Weld 16 gauge stainless steel in flat position (1F,1G)					X	X		
25 Weld 16 gauge stainless steel in horizontal positi (2F,2G)					X	X		

	MT	M	TD	PP	SM	CW	MR	AM
26 Weld 16 gauge stainless steel in vertical up/down positions (3F, 3G)					X	X		
27 Weld 16 gauge stainless steel in overhead position (4F,4G)						X		
28 Weld 1/4" aluminum in flat position (1F,1G)					X	X		
29 Weld 1/4" aluminum in horizontal position (2F,2G)					X	X		
30 Weld 1/4" aluminum in vertical up/down positions (3F,3G)						X		
31 Weld 1/4" aluminum in overhead position (4F,4G)						X		

PERFORMING GAS TUNGSTEN ARC WELDING (GTAW)

	MT	M	TD	PP	SM	CW	MR	AM
1 Select gas tungsten arc welding (GTAW) equipment, electrodes, gases, and filler metal according to job					X	X		
2 Set up gas tungsten arc welding equipment					X	X		
3 Perform minor maintenance on gas tungsten arc welding equipment					X	X		
4 Weld 1/8" mild steel in flat position (1F,1G)					X	X		
5 Weld 1/8" mild steel in horizontal position (2F,2G)					X	X		
6 Weld 1/8" mild steel in vertical up/down positions (3F,3G)					X	X		
7 Weld 1/8" mild steel in overhead position (4F,4G)						X		
8 Weld 3" schedule 40 steel pipe in 1G position						X		
9 Weld 4" schedule 10 steel pipe in 6G position						X		
10 Weld 8" schedule 60 steel pipe in 1G position						X		
11 Weld 8" schedule 60 steel pipe in 2G position						X		
12 Weld 8" schedule 60 steel pipe in 5G position						X		
13 Weld 8" schedule 60 steel pipe in 6G position						X		
14 Weld 8" schedule 60 steel pipe in 6G position with pulsed current						X		
15 Weld 8" schedule 60 steel pipe in 5G position with Grinnell insert						X		
16 Weld 8" schedule 60 steel pipe in 1F position						X		
17 Weld 8" schedule 60 steel pipe in 2F position						X		
18 Weld 8" schedule 60 steel pipe in 2FR position						X		
19 Weld 8" schedule 60 steel pipe in 4F position						X		
20 Weld 8" schedule 60 steel pipe in 5F position						X		

	MT	M	TD	PP	SM	CW	MR	AM
21 Weld 8" schedule 40S stainless steel pipe in 6G position						X		
22 Weld 16 gauge stainless steel in flat position (1F,1G)					X	X		
23 Weld 16 gauge stainless steel in horizontal position (2F,2G)					X	X		
24 Weld 16 gauge stainless steel in vertical up/down positions (3F,3G)						X		
25 Weld 16 gauge stainless steel in overhead position (4F,4G)						X		
26 Weld single vee-groove butt joint on 3/8" steel plate (1G,4G)						X		
27 Weld 11 gauge aluminum in flat position (1F,1G)					X	X		
28 Weld 11 gauge aluminum in horizontal position (2F,2G)					X	X		
29 Weld 11 gauge aluminum in vertical up/down positions (3F,3G)					X	X		
30 Weld 11 gauge aluminum in overhead position (4F,4G)						X		

PERFORMING FLUX CORE ARC WELDING (FCAW)

	MT	M	TD	PP	SM	CW	MR	AM
1 Select flux core arc welding (FCAW) equipment, gases and filler metal according to job						X		
2 Set up flux core arc welding equipment						X		
3 Perform minor maintenence on flux core arc welding equipment						X		
4 Weld 1" steel plate, lap joint in 1F position with external shielded wire						X		
5 Weld 1" steel plate, lap joint in 2F position with external shielded wire						X		
6 Weld 1" steel plate, lap joint in 1F position with self shielded wire						X		
7 Weld 1" steel plate, lap joint in 2F position with self shielded wire						X		
8 Weld 1" steel plate, vee-groove butt joint in 1G position with external shielded wire						X		
9 Weld 1" steel plate, vee-groove butt joint in 2G position with external shielded wire						X		
10 Weld 1/2" steel plate, T-joint in 3G position up with external shielded wire						X		
11 Weld 3/8" steel plate, vee-groove butt joint in 3G position up with external shielded wire						X		
12 Weld 1/4" steel plate, T-joint in 4F position with external shielded wire						X		

PERFORMING PLASMA ARC WELDING (PAW)

	MT	M	TD	PP	SM	CW	MR	AM
1 Select plasma arc welding (PAW) equipment, gases and filler metal according to job						X		
2 Set up plasma arc welding equipment						X		
3 Perform minor maintenance on plasma arc welding equipment						X		

	MT	M	TD	PP	SM	CW	MR	AM
4 Weld 16 gauge mild steel in flat position (1F,1G)						X		
5 Weld 16 gauge mild steel in horizontal position (2F,2G)						X		
6 Weld 16 gauge aluminum in flat position (1F,1G)						X		
7 Weld 16 gauge aluminum in horizontal position (2F,2G)						X		
8 Weld 1/8" aluminum in flat position (1F,1G)						X		
9 Weld 1/8" aluminum in horizontal position (2F,2G)						X		
10 Weld 22 gauge stainless steel in flat position (1F,1G)						X		
11 Weld 22 gauge stainless steel in horizontal position (2F,2G)						X		
12 Weld 1/8" stainless steel in flat position (1F,1G)						X		
13 Weld 1/8" stainless steel in horizontal position (2F,2G)						X		

PERFORMING SUBMERGED ARC WELDING (SAW)

	MT	M	TD	PP	SM	CW	MR	AM
1 Select submerged arc welding (SAW) equipment, filler metal and flux according to job						X		
2 Set up submerged arc welding equipment						X		
3 Perform minor maintenance on submerged arc welding equipment						X		
4 Weld 1/8" mild steel in flat position (1G) with automatic equipment						X		
5 Weld 1/4" mild steel in flat position (1F) with semi-automatic equipment						X		
6 Weld 1" mild steel, vee-groove butt joint in flat position (1G) with automatic equipment						X		
7 Weld 1/4" mild steel, T-joint in horizontal position (1F) with automatic equipment						X		
8 Weld 1/4" mild steel, lap-joint in horizontal position (1F) with automatic equipment						X		

PERFORMING RESISTANCE WELDING

	MT	M	TD	PP	SM	CW	MR	AM
1 Select resistance welding equipment according to job					X	X		
2 Set up resistance welding equipment					X	X		
3 Perform minor maintenance on resistance welding equipment					X	X		
4 Weld materials by spot welding					X	X		
5 Weld materials by projection welding						X		
6 Weld materials by flash welding						X		
7 Weld materials by seam welding						X		
8 Weld materials by pulsation welding						X		
9 Weld materials by butt welding						X		

PERFORMING ELECTROSLAG WELDING (ESW)

	MT	M	TD	PP	SM	CW	MR	AM
1 Select electroslag welding (ESW) equipment, filler metal and flux according to job						X		
2 Set up electroslag welding equipment						X		
3 Weld materials using electroslag welding process						X		

PERFORMING ULTRASONIC WELDING (USW)

	MT	M	TD	PP	SM	CW	MR	AM
1 Set up ultrasonic welding (USW) equipment						X		
2 Perform minor maintenance on ultrasonic equipment						X		
3 Weld materials using ultrasonic welding process						X		

PERFORMING LASER BEAM WELDING (LBW)

	MT	M	TD	PP	SM	CW	MR	AM
1 Set up laser beam welding (LBW) equipment						X		
2 Weld materials using laser beam welding process						X		

PERFORMING ELECTRON BEAM WELDING (EBW)

	MT	M	TD	PP	SM	CW	MR	AM
1 Set up electron beam welding (EBW) equipment						X		
2 Weld materials using electron beam welding process						X		

PERFORMING INERTIA WELDING

	MT	M	TD	PP	SM	CW	MR	AM
1 Set up inertia welding equipment						X		
2 Weld materials using inertia welding process						X		

PERFORMING UNDERWATER WELDING

	MT	M	TD	PP	SM	CW	MR	AM
1 Select equipment and electrodes for underwater welding according to job						X		
2 Set up underwater welding equipment						X		
3 Weld materials underwater in various position (1F,4F)						X		
4 Select equipment, gases and electrodes for underwater cutting according to job						X		
5 Set up underwater cutting equipment						X		
6 Cut materials underwater						X		

PERFORMING PLASTIC WELDING

	MT	M	TD	PP	SM	CW	MR	AM
1 Select plastic welding equipment and gases according to job						X		
2 Set up plastic welding equipment						X		
3 Weld plastics using the hot gas method						X		
4 Weld plastics using the heated tool method						X		
5 Weld plastics using the induction method						X		

TESTING WELDS

		MT	M	TD	PP	SM	CW	MR	AM
1	Select destructive or non-destructive methods for testing welds						X		
2	Perform visual inspection of welded materials						X		
3	Perform liquid penetrant tests on welded materials						X		
4	Perform hardness tests on welded materials						X		
5	Perform guided bend tests on welded materials						X		
6	Perform tensile tests on welded materials						X		
7	Perform impact tests on welded materials						X		
8	Perform radiographic tests on welded materials						X		
9	Perform ultrasonic tests on welded materials						X		
10	Perform magnetic particle tests on welded materials						X		

ASSEMBLING AND DISASSEMBLING MACHINE MECHANISMS

		MT	M	TD	PP	SM	CW	MR	AM
1	Install belts and pulleys							X	X
2	Align and adjust tension of belt drives							X	X
3	Maintain belt drives							X	X
4	Construct belt joints							X	X
5	Inspect belt drive systems							X	X
6	Troubleshoot belt drive systems							X	X
7	Repair belt drive systems							X	X
8	Install chain and sprocket drive							X	X
9	Align and adjust tension of chain and sprocket drives							X	X
10	Maintain chain and sprocket drives							X	X
11	Inspect chain and sprocket drives							X	X
12	Troubleshoot chain and sprocket drives							X	X
13	Repair chain and sprocket drives							X	X
14	Install and align gear drives							X	X
15	Maintain gear drives							X	X
16	Clean and lubricate gear drives							X	X
17	Inspect variable speed drives							X	X
18	Troubleshoot variable speed drives							X	X
19	Repair variable speed drives							X	X
20	Inspect rack and pinion drives							X	X
21	Troubleshoot rack and pinion drives							X	X
22	Repair rack and pinion drives							X	X
23	Inspect ring and pinion drives							X	X
24	Troubleshoot ring and pinion drives							X	X
25	Repair ring and pinion drives							X	X
26	Inspect gear box drives							X	X
27	Troubleshoot gear box drives							X	X
28	Repair gear box drives							X	X
29	Install couplings							X	X
30	Align couplings							X	X
31	Inspect couplings							X	X
32	Troubleshoot couplings							X	X
33	Disassemble and reassemble couplings							X	X
34	Replace packing and seals							X	X
35	Remove and install mechanical seals							X	X
36	Align pillow blocks and bearings							X	X
37	Install pillow blocks and bearings							X	X
38	Remove and install bearings in bores							X	X

	MT	M	TD	PP	SM	CW	MR	AM
39 Remove and install sleeve bearings in bores							X	X
40 Remove and install bearings on shafts							X	X
41 Lubricate equipment							X	X
42 Inspect bearings and mechanisms							X	X
43 Troubleshoot bearings							X	X
44 Replace shaft							X	X
45 Install shaft assembly							X	X
46 Align shaft							X	X
47 Replace universal joint							X	X
48 Install universal joint							X	X
49 Repair universal joint							X	X
50 Adjust gibs for free operation							X	X
51 Inspect linkages and lever mechanisms							X	X
52 Troubleshoot linkages and lever mechanisms							X	X
53 Repair linkages and lever mechanisms							X	X
54 Install centrifugal clutch							X	X
55 Inspect centrifugal clutch							X	X
56 Repair centrifugal clutch							X	X
57 Install safety guards for conveyor system							X	X
58 Fabricate safety guards for conveyor system							X	X
59 Align drive mechanism for conveyor system							X	X
60 Assemble conveyor system from component parts							X	X
61 Install conveyor into material handling system							X	X
62 Troubleshoot conveyor system							X	X
63 Repair conveyor system							X	X

INSTALLING AND REMOVING MACHINERY

	MT	M	TD	PP	SM	CW	MR	AM
1 Prepare area for machine installation							X	X
2 Raise machinery using jacks, bars and blocks							X	X
3 Move machinery using fork lift							X	X
4 Rig chain fall to remove or install machinery							X	X
5 Move machinery using overhead crane or chainfall							X	X
6 Position and secure machinery on foundation							X	X
7 Level machinery on foundation							X	X
8 Align machinery							X	X
9 Connect machinery to electrical source							X	X
10 Connect machine to air or hydraulic source							X	X
11 Balance machinery using vibration test							X	X
12 Block and brace equipment for moving or shipping							X	X
13 Crib equipment							X	X
14 Lift equipment using slings							X	X
15 Move equipment with skids							X	X
16 Move equipment with dollies							X	X

MAINTAINING HYDRAULIC SYSTEMS

	MT	M	TD	PP	SM	CW	MR	AM
1 Shut down hydraulic system							X	X
2 Replace and clean hydraulic strainer/filters							X	X
3 Clean and flush hydraulic motor system							X	X
4 Drain and refill hydraulic system							X	X
5 Troubleshoot hydraulic actuator							X	X
6 Replace hydraulic actuator							X	X
7 Adjust hydraulic pressure							X	X
8 Troubleshoot pressure regulators							X	X

	MT	M	TD	PP	SM	CW	MR	AM
9 Troubleshoot hydraulic control valve operations							X	X
10 Inspect pressure control valve							X	X
11 Replace valve in hydraulic system							X	X
12 Null hydraulic servo valve							X	X
13 Test accumulator charge							X	X
14 Recharge accumulator							X	X
15 Replace defective accumulator							X	X
16 Replace hydraulic pump							X	X
17 Align hydraulic pump							X	X
18 Seal gaskets							X	X
19 Replace hydraulic motor							X	X
20 Align hydraulic motor							X	X
21 Replace internal components in hydraulic motor							X	X
22 Replace hydraulic gasket and seals							X	X
23 Install hydraulic line							X	X
24 Connect hydraulic components to machines							X	X
25 Replace damaged hydraulic lines, fittings, and components							X	X
26 Clear restriction from sealed hydraulic system							X	X
27 Troubleshoot heat exchanger							X	X
28 Measure pressure within hydraulic system							X	X
29 Measure flow within hydraulic system							X	X
30 Inspect hydraulic systems							X	X
31 Troubleshoot hydraulic systems							X	X
32 Repair hydraulic systems							X	X
33 Maintain hydraulic systems							X	X
34 Determine problem using available troubleshooting techniques							X	X
35 Interpret control diagrams for hydraulic systems							X	X
36 Diagnose malfunctions of hydraulic systems using test and measurement equipment							X	X

MAINTAINING PNEUMATIC SYSTEMS

	MT	M	TD	PP	SM	CW	MR	AM
1 Troubleshoot air pressure regulators							X	X
2 Troubleshoot pneumatic pump							X	X
3 Verify pneumatic flow control valve operation							X	X
4 Troubleshoot pneumatic actuator							X	X
5 Replace defective pneumatic gages							X	X
6 Replace defective pneumatic lines							X	X
7 Replace air filter							X	X
8 Service pneumatic air compressor							X	X
9 Replace pneumatic air compressor							X	X
10 Verify air motor							X	X
11 Replace air motor							X	X
12 Sequence pneumatic cylinders							X	X
13 Replace pneumatic cylinders							X	X
14 Verify humidity control							X	X
15 Troubleshoot air logic system							X	X
16 Verify air logic to diagram							X	X
17 Leak test vacuum/pressure system							X	X
18 Clear restrictions from sealed pneumatic system							X	X
19 Test fittings for air leaks							X	X

	MT	M	TD	PP	SM	CW	MR	AM
20 Repair air leaks							X	X
21 Replace defective fittings							X	X
22 Lubricate pneumatic system							X	X
23 Install pneumatic systems							X	X
24 Inspect pneumatic systems							X	X
25 Troubleshoot pneumatic systems							X	X
26 Repair pneumatic systems							X	X
27 Maintain pneumatic systems							X	X
28 Determine problem using available troubleshooting techniques							X	X
29 Interpret control diagrams for pneumatic systems							X	X
30 Diagnose malfunctions of pneumatic systems using test and measurement equipment							X	X

MAINTAINING AND REPAIRING ELECTRICAL SYSTEMS

	MT	M	TD	PP	SM	CW	MR	AM
1 Replace fuses							X	X
2 Reset circuit breaker after overload							X	X
3 Remove electrical overloads							X	X
4 Troubleshoot electrical control components							X	X
5 Change rotation of 3-phase electric motor							X	X
6 Replace faulty electrical cords and plugs							X	X
7 Replace electric motor brushes							X	X
8 Lubricate electric motor							X	X
9 Install or replace electric motor							X	X
10 Clean electric motor							X	X
11 Replace defective relay							X	X
12 Verify electrical sensor operation							X	X
13 Verify motor starter circuit							X	X
14 Verify electric motor operation							X	X
15 Verify thermostat operation							X	X
16 Verify power supply operation							X	X
17 Verify solenoid operation							X	X
18 Determine electrical problems using available troubleshooting techniques							X	X
19 Interpret control diagrams for electrical systems							X	X
20 Diagnose malfunctions of electrical systems using test and measurement equipment							X	X

MAINTAINING AND REPAIRING HEATING AND COOLING DEVICES

	MT	M	TD	PP	SM	CW	MR	AM
1 Calibrate and adjust thermostat							X	
2 Lubricate air compressor							X	
3 Adjust air compressor to minimize noise							X	
4 Adjust air compressor to reduce overload							X	
5 Disassemble and reassemble air compressor							X	
6 Install air compressor							X	
7 Clean condenser/evaporator							X	
8 Install air cooled condenser							X	
9 Install evaporative condenser							X	
10 Calibrate metering devices							X	
11 Clean air circulation ducts							X	
12 Install fan guards, shrouds or mesh covers							X	
13 Install mechanical roof ventilators							X	
14 Remove foreign debris from cooling towers							X	

	MT	M	TD	PP	SM	CW	MR	AM
15 Drain and charge air conditioning system							X	
16 Clean and lubricate fans and ventilators							X	
17 Calibrate and adjust airflow controls							X	
18 Calibrate and adjust temperature controls							X	
19 Calibrate and adjust pneumatic controls							X	
20 Calibrate and adjust pressure controls							X	
21 Replace air filters and air bags							X	
22 Assemble and disassemble centrifugal fan							X	
23 Inspect freight and personnel elevators							X	
24 Adjust doors, guards and gates for elevators							X	
25 Replace elevator cables							X	
26 Replace hand controls for elevators							X	

INSPECTING AND REPAIRING CRANES AND ELEVATORS

	MT	M	TD	PP	SM	CW	MR	AM
1 Replace cable on electric cable drum hoist							X	
2 Replace cable on bridge crane							X	
3 Replace pulleys on cranes							X	
4 Replace mechanical safety devices on cranes							X	
5 Replace electrical safety devices on cranes							X	
6 Inspect tracks and runway areas							X	
7 Replace runway tracks for cranes							X	
8 Adjust mechanical brakes on cranes and elevators							X	
9 Troubleshoot and repair cranes							X	
10 Troubleshoot and repair elevators							X	

MAINTAINING AND REPAIRING ELECTRONIC CONTROL SYSTEMS

	MT	M	TD	PP	SM	CW	MR	AM
1 Verify servo amplifier operation							X	X
2 Insure that environmental conditions are met								X
3 Verify servo motor control circuits							X	X
4 Verify terminal device operation							X	X
5 Troubleshoot communications links							X	X
6 Troubleshoot printed circuit board							X	X
7 Calibrate position feedback device							X	X
8 Troubleshoot position device							X	X
9 Troubleshoot robot controller								X
10 Perform electrical adjustments on servo power amplifiers							X	X
11 Determine problem using available trouble-shooting techniques								X
12 Interpret control diagrams for electronic systems								X
13 Diagnose malfunctions of electronic systems using test and measurement equipment								X
14 Interchange different open-loop controllers between systems								X
15 Interchange different closed-loop controllers between systems								X
16 Adjust control system feedback loops								X

MAINTAINING AND REPAIRING AUTOMATED SYSTEMS

	MT	M	TD	PP	SM	CW	MR	AM
1 Run diagnostic routine								X
2 Troubleshoot end effectors								X
3 Troubleshoot automatic lubrication system								X

		MT	M	TD	PP	SM	CW	MR	AM
4	Troubleshoot vision system								X
5	Verify pressure control system operation								X
6	Troubleshoot pressure or vacuum switch operation								X
7	Verify drive mechanism								X
8	Troubleshoot timing of automated (CAM) system								X
9	Service bearings								X
10	Adjust clutch/brake system								X
11	Adjust linkage								X
12	Troubleshoot overload protection device operation								X
13	Apply requirements of service bulletins								X
14	Aid fault isolation using manual's troubleshooting charts								X
15	Aid fault repair using manual's trouble-shooting charts								X
16	Disassemble, repair, test, and return to service robots which have failed								X
17	Troubleshoot and repair automated systems								X
18	Maintain automated systems								X

INSTALLING AND TROUBLESHOOTING SENSORS

		MT	M	TD	PP	SM	CW	MR	AM
1	Install and adjust tactile sensors								X
2	Troubleshoot and repair tactile sensors								X
3	Install and adjust video sensors								X
4	Troubleshoot and repair video sensors								X
5	Install and adjust fiber-optic components								X
6	Troubleshoot and repair fiber-optic components								X
7	Troubleshoot and repair fiber-optic systems								X
8	Set up machine vision system								X
9	Install and adjust magnetic sensors								X
10	Troubleshoot and repair magnetic sensors								X
11	Install and adjust thermal sensors								X
12	Troubleshoot and repair thermal sensors								X
13	Install and adjust sonic sensors								X
14	Troubleshoot and repair sonic sensors								X
15	Install and adjust pressure sensors								X
16	Troubleshoot and repair pressure sensors								X
17	Install and adjust microwave sensors								X
18	Troubleshoot and repair microwave sensors								X

INSTALLING AUTOMATED SYSTEMS

		MT	M	TD	PP	SM	CW	MR	AM
1	Install robots								X
2	Install work cell								X
3	Install automated systems								X
4	Evaluate initial start-up of robotic system								X
5	Evaluate initial start-up of work cell								X
6	Evaluate initial start-up of automated system								X
7	Start up and debug robot system								X
8	Measure robot performance for distance								X
9	Measure robot performance for positioning								X
10	Measure robot performance for accuracy								X
11	Measure robot performance for repeatability								X
12	Analyze operating difficulties of robots and adjust to specifications								X

	MT	M	TD	PP	SM	CW	MR	AM
13 Adjust equipment for accuracy and repeatability								X
14 Install and adjust end of arm tools (end effectors)								X
15 Install and adjust actuators (open/closed loop)								X
16 Verify system interlock operation								X
17 Install robot controller								X
18 Install programmable controller and input/output devices								X
19 Install communication links								X
20 Optimize existing system performance								X
21 Field test robot to assure conformance to specifications								X
22 Define axis control & feedback specifications								X
23 Specify robot coordinate system								X
24 Define human interface with automated system								X
25 Interconnect robots & other equipment								X
26 Analyze & select sensing requirements for manufacturing requirements								X
27 Set up robot to pick and place								X
28 Design system for counting regularly shaped objects								X
29 Design system for counting irregularly shaped objects								X
30 Coordinate operation of several pieces of automatic equipment								X
31 Adjust automated systems for accuracy and repeatability								X
32 Start up and shut down automated production system								X
33 Follow manufacturer's troubleshooting procedures for automated system								X

PROGRAMMING AUTOMATED SYSTEMS

	MT	M	TD	PP	SM	CW	MR	AM
1 Develop written program								X
2 Enter executive software into control unit								X
3 Load program into robot								X
4 Test program								X
5 Operate teach mode								X
6 Interpret error messages								X
7 Program stepper motors								X
8 Program programmable logic controllers (PLC's) for specific sequence of events in performing application								X
9 Draw logic diagrams (flow charts)								X
10 Program, test, & edit using teaching pendant								X
11 Perform zeroing of encoders								X

PROGRAMMING AND PLANNING

	MT	M	TD	PP	SM	CW	MR	AM
1 Develop programmed instructions from blueprint								X
2 Develop programmed instructions from piece part								X
3 Draw sketch of desired workpiece								X
4 Select program, (manual or computer-assisted)								X
5 Choose machine tools for part								X

	MT	M	TD	PP	SM	CW	MR	AM
6 Select tools and holders								X
7 Select spindle speed								X
8 Select feedrate for axis travel								X
9 Position workpiece in relation to machine axis								X
10 Determine absolute or incremental mode								X
11 Compute polar/rectangular coordinates								X
12 Compute workpiece geometry								X
13 Verify cutter path								X
14 Plot program								X
15 Depict part graphically								X
16 Define cutter path								X
17 Operate post processor								X
18 Write post processor								X
19 Program tool change procedure								X
20 Prepare operator instructions for piece part								X
21 Calculate run time								X
22 Prepare tape								X
23 Select canned cycles								X
24 Program restart points								X
25 Write manual program								X
26 Program with purchased software								X
27 Design special fixtures for custom job								X
28 Design clamps & holders for custom job								X
29 Write manual complex contouring program								X
30 Enter tool offset								X
31 Enter tool length compensation								X
32 Repair broken tape								X
33 Update programs from engineering changes								X
34 Determine job priorities								X
35 Schedule programs								X
36 Schedule heat-treated materials								X
37 Schedule secondary processes								X
38 Schedule plating								X

PERFORMING OPERATING FUNCTIONS OF AUTOMATED SYSTEM

	MT	M	TD	PP	SM	CW	MR	AM
1 Assist supervisor in implementing plan for initial setup installation and maintenance of automated system								X
2 Determine resources needed to continue production								X
3 Arrange for acquisition of equipment and materials								X
4 Coordinate with other workers to complete task								X

PERFORMING COMMUNICATION FUNCTIONS

	MT	M	TD	PP	SM	CW	MR	AM
1 Prepare technical reports including charts, graphs, status reports, project summary and manuals							X	X
2 Make oral presentations							X	X
3 Interface with vendors								X
4 Demonstrate how equipment works							X	X
5 Train others in use of automated system's equipment								X

PERFORMING QUALITY CONTROL AND QUALITY ASSURANCE FUNCTIONS

	MT	M	TD	PP	SM	CW	MR	AM
1 Co-develop and implement quality control and inspection standards and procedures								X
2 Conduct quality tests on process and product								X
3 Calibrate test and measurement equipment								X
4 Participate in work teams								X
5 Apply statistical in-process quality control (SPC)								X

ADAPTING AUTOMATED SYSTEMS FOR MANUFACTURING

	MT	M	TD	PP	SM	CW	MR	AM
1 Adapt automated system for welding applications								X
2 Adapt automated system for painting applications								X
3 Adapt automated system for bonding applications								X
4 Adapt automated system for machining applications								X
5 Adapt automated system for material handling applications								X
6 Adapt automated system for assembly applications								X
7 Adapt automated system for packing applications								X

EMPLOYABILITY SKILLS

DUTY A: Identifying Employment Opportunities

SKILLS:
1 Identify requirements for job
2 Investigate educational opportunities
3 Investigate occupational opportunities
4 Locate resources for finding employment
5 Confer with prospective employers
6 Identify job trends

DUTY B: Applying Employment Seeking Skills

SKILLS:
1 Locate job openings
2 Document skills and abilities (resume)
3 Prepare for interview
4 Participate in interview
5 Complete required tests
6 Complete required forms
7 Write application letter
8 Write follow-up letter
9 Write acceptance letter
10 Evaluate job offer
11 Evaluate job rejection

DUTY C: Interpreting Employment Capabilities

SKILLS:
1 Match interest to job area
2 Match aptitudes to job area
3 Verify abilities
4 Identify immediate work goal
5 Develop career plan

DUTY D: Demonstrating Appropriate Work Behavior

SKILLS:
1 Exhibit dependability
2 Demonstrate punctuality
3 Follow rules and regulations
4 Recognize the consequences of dishonesty
5 Complete assignments in accurate and timely manner
6 Control emotions
7 Assume responsibility for own decisions and actions
8 Exhibit pride and loyalty
9 Exhibit ability to handle pressures and tensions
10 Demonstrate ability to set priorities
11 Demonstrate problem-solving skills

DUTY E: Maintaining Safe and Healthy Environment

SKILLS:
1 Comply with safety and health rules
2 Select correct tools and equipment
3 Utilize equipment correctly

4 Use appropriate action during emergencies
5 Maintain clean and orderly work area
6 Demonstrate personal hygiene and cleanliness

DUTY F: Maintaining Business-Like Image

SKILLS: 1 Participate in company or agency orientation
2 Demonstrate knowledge of company or agency products and services
3 Exhibit positive behavior
4 Read current job-related publications
5 Support and promote employer's company image and purpose
6 Maintain appearance to comply with company standards

DUTY G: Maintaining Working Relationships with Others

SKILLS: 1 Work productively with others
2 Show empathy, respect and support for others
3 Demonstrate procedures and assist others when necessary
4 Recognize, analyze and solve or refer problems
5 Minimize occurrence of problems
6 Channel emotional reaction constructively

DUTY H: Communicating on the Job

SKILLS: 1 Read and comprehend written communications and information
2 Use correct grammar
3 Speak effectively with others
4 Use job-related terminology
5 Listen attentively
6 Write legibly
7 Use telephone etiquette
8 Follow written and oral directions
9 Ask questions
10 Locate information in order to accomplish task
11 Prepare written communication
12 Utilize keyboarding skills
13 Utilize computer skills

DUTY I: Adapting to Change

SKILLS: 1 Recognize need to change
2 Demonstrate willingness to learn
3 Demonstrate flexibility
4 Participate in continuing education
5 Seek work challenges
6 Adjust career goals/plan as needed

DUTY J: Understanding How a Business Works

SKILLS:
1 Recognize the role of business in the enterprise system
2 Identify general responsibilities of employees
3 Identify general responsibilities of management/employers
4 Investigate opportunities and options for business ownership
5 Identify planning processes needed to open a business
6 Participate in meetings

DUTY K: Performing Mathematical Skills

SKILLS:
1 Apply mathematics for problem solving
2 Add and subtract whole numbers, decimals and fractions
3 Multiply and divide whole numbers, decimals and fractions
4 Convert numbers between forms expressed as fractions, decimals and percents
5 Convert between standard American units of measure
6 Convert between standard American units and metric units

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

DUTY A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident report
4 Inspect work area and equipment for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committee
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation (CPR) techniques
11 Comply with safety requirements for working around automated systems
12 Participate in safety training program

DUTY B: Performing Benchwork Operations

TASKS:
1 Cut threads with taps and dies
2 Remove threaded fasteners and repair threads
3 Deburr parts
4 Polish parts using coated abrasives
5 Sharpen and polish tools using abrasive stones
6 Disassemble, assemble and straighten parts using arbor press
7 Cut keyway with broach
8 Set up and use hone to apply specified surface in hole
9 Disassemble, fit and reassemble parts
10 Lift and position workpiece using hoists
11 Work materials with hand tools
12 Work materials with portable power tools

DUTY C: Performing Precision Measurement

TASKS:
1 Measure parts with semi-precision measuring tools
2 Inspect parts with precision measuring tools
3 Inspect parts with comparison measuring tools
4 Inspect parts using go/no go gages
5 Measure parts using dial calipers
6 Measure parts using vernier measuring tools
7 Measure parts using outside micrometers
8 Measure parts using inside micrometers
9 Measure parts using depth micrometers
10 Measure parts using telescoping gages
11 Measure parts using small hole gages
12 Measure parts using bore gages
13 Inspect parts using radius gages

14 Set up and inspect parts using dial indicators
15 Measure parts using optical comparators
16 Measure parts with height gage
17 Measure threads
18 Measure tapers
19 Inspect keyways
20 Measure gears
21 Inspect surface finish of parts
22 Calibrate precision measuring tools
23 Clean and store precision measuring tools
24 Inspect parts according to quality control and inspection standards and procedures
25 Conduct quality tests under differing environmental conditions
26 Inspect machined parts
27 Inspect parts with metric measuring instruments

DUTY D: Performing Layouts

TASKS:
1 Analyze specifications
2 Compute layout dimensions
3 Plan layout operations
4 Label workpiece
5 Perform semi-precision layouts
6 Perform precision layouts from blueprints

DUTY E: Operating Saws

TASKS:
1 Remove and replace saw blades
2 Cut and weld bandsaw blades
3 Calculate and set cutting speed and feed rate for sawing
4 Saw straight, curved and irregular lines on vertical band saws
5 Saw material to layout with vertical band saw
6 Set up and use vertical band saw for interior contour sawing
7 Set up and use vertical band saw to file parts
8 Cut straight lines on vertical band saw using automatic feed
9 Cut angles on vertical band saw by tilting table
10 Set up and use jigs and fixtures for special sawing operations
11 Slot, groove, miter and trim parts on saw
12 Set up and use stops and guides to control dimension of cuts
13 Set up and use automatic bar feed mechanism for production work
14 Set up and use horizontal band saw for production work

15 Set up and use power hack saw for production work
16 Set up and use circular saw for production work
17 Set up and use friction saw for production work
18 Set up and use rubber disk saw for production work
19 Use and maintain coolant system for sawing
20 Perform basic saw maintenance

DUTY F: Operating Drilling Machines

TASKS:
1 Select drills using drill chart
2 Use and maintain coolant system for drilling
3 Change drills and tool holders
4 Align tools with drill guide bushings
5 Center drill and drill holes to size
6 Countersink, counterbore and spot face parts to specifications
7 Drill blind holes to specifications
8 Drill deep holes to specifications
9 Drill holes to specifications using special drills
10 Thread parts using tapping attachment
11 Ream holes to size
12 Burnish parts to specifications
13 Drill holes at angle by tilting head or table
14 Perform basic drilling machine maintenance

DUTY G: Operating Bench Grinders

TASKS:
1 Change and dress bench grinding wheels
2 Sharpen and recondition hand tools
3 Perform basic bench grinder maintenance

DUTY H: Operating Lathes

TASKS:
1 Use and maintain coolant system on lathe
2 Face and turn parts in 3-jaw chuck
3 Machine parts between centers
4 Indicate and machine parts in 4-jaw chuck
5 Machine parts using collet chucks
6 Machine parts using faceplate
7 Perform forming operations
8 Perform knurling operations
9 Center drill and drill parts
10 Bore, face and recess internal diameters
11 Ream holes to specifications
12 Undercut diameters and shoulders
13 Machine eccentric diameters
14 Manufacture springs
15 Cut off parts
16 Turn tapers
17 Machine internal tapers
18 Thread external diameters

19 Thread internal diameters
20 Repair threads
21 Hold dimensions using feed, precision and indicator stops on lathe
22 Hold dimensions using digital readout on lathe
23 Machine parts using carbide tooling
24 Machine parts using ceramic tooling
25 Machine parts using steady rest
26 Machine long parts using follower rest
27 Machine parts using jigs and fixtures
28 Machine radii
29 Duplicate parts using tracing attachment
30 Grind parts using tool post grinder
31 Machine parts using quick change tooling system
32 Perform basic lathe maintenance

DUTY I: Operating Vertical Milling Machines

TASKS:
1 Use and maintain coolant system on milling machine
2 Hold dimensions using table and precision stops on vertical mill
3 Hold dimensions using digital readout on vertical mill
4 Machine parts using end milling cutters on vertical mill
5 Machine parts using carbide milling cutters on vertical mill
6 Machine parts using ceramic milling cutters on vertical mill
7 Machine parts using conventional and climb milling on vertical mill
8 Machine parts square on vertical mill
9 Machine closed pockets on vertical mill
10 Machine angles on vertical mill
11 Machine radii using form milling cutter on vertical mill
12 Machine keyways on vertical mill
13 Machine "T" slots on vertical mill
14 Machine dovetails on vertical mill
15 Center drill, drill and ream holes on vertical mill
16 Tap holes on vertical mill
17 Bore, face and recess diameters using boring head
18 Set up and use jigs and fixtures on vertical mill
19 Mill multiple surfaces using indexing fixture on vertical mill
20 Mill multiple surfaces using dividing head on vertical mill
21 Mill radii using rotary table
22 Drill hole patterns using rotary table
23 Mill angles using rotary table
24 Duplicate contours using tracing attachment
25 Perform basic vertical milling machine maintenance

DUTY J: Operating Horizontal Milling Machines

TASKS:
1 Hold dimensions using table and precision stops on horizontal mill
2 Hold dimensions using digital readouts on horizontal mill
3 Machine parts using conventional and climb milling on horizontal mill
4 Machine parts using carbide insert cutters on horizontal mill
5 Machine parts using ceramic cutting tools on horizontal mill
6 Perform slab milling
7 Perform gang milling
8 Perform straddle milling
9 Mill parts square using horizontal mill
10 Mill angles on horizontal mill
11 Machine keyways on horizontal mill
12 Machine deep slots on horizontal mill
13 Cut off parts using horizontal mill
14 Machine gears on horizontal mill using dividing head
15 Machine splines on horizontal mill using dividing head
16 Machine rack on horizontal mill
17 Machine multiple surfaces using indexing fixture on horizontal mill
18 Perform basic horizontal milling machine maintenance

DUTY K: Operating Boring Machines

TASKS:
1 Use and maintain coolant system on boring machine
2 Hold dimensions using table and precision stops on boring machine
3 Hold dimensions using digital readout on boring machine
4 Center drill, drill and ream holes on boring machine
5 Countersink, counterbore and spot face holes on boring machine
6 Tap holes on boring machine
7 Bore, face and recess internal surfaces on boring machine
8 Machine external surfaces on boring machine
9 Perform basic boring machine maintenance

DUTY L: Operating Surface Grinders

TASKS:
1 Maintain grinding coolant system
2 Grind parallel surfaces on surface grinder
3 Grind parts square on surface grinder
4 Grind vertical surface on surface grinder

5 Grind angles on surface grinder
6 Grind radii on surface grinder
7 Grind profiles on surface grinder
8 Remove warp using surface grinder
9 Cut off parts on surface grinder
10 Inspect ground parts
11 Perform basic surface grinder maintenance

DUTY M: Operating Inside Diameter (I.D.) Grinders

TASKS:
1 Parallel grind inside diameters
2 Grind to internal shoulder
3 Grind internal taper
4 Grind internal radius
5 Grind internal recess
6 Grind internal angle
7 Face grind internal shoulder
8 Grind blind hole
9 Grind through parts
10 Inspect inside diameters of ground parts
11 Perform basic I.D. grinder maintenance

DUTY N: Operating Outside Diameter (O.D.) Grinders

TASKS:
1 Parallel grind outside diameters on O.D. grinder
2 Grind to external shoulder on O.D. grinder
3 Grind external taper on O.D. grinder
4 Grind external radius on O.D. grinder
5 Grind external angle on O.D. grinder
6 Plunge grind external diameter on O.D. grinder
7 Grind parts between centers
8 Grind parts using collet chucks
9 Grind parts using other work holding devices
10 Grind parts using steady rest
11 Grind parts using follower rest
12 Grind complex profile on O.D. grinder
13 Inspect outside diameters of parts ground on O.D. grinder
14 Perform basic O.D. grinder maintenance

DUTY O: Operating Centerless Grinders

TASKS:
1 Parallel grind outside diameters on centerless grinder
2 Grind to external shoulder on centerless grinder
3 Grind external taper on centerless grinder
4 Grind external radius on centerless grinder
5 Grind external angle on centerless grinder
6 Plunge grind external diameter on centerless grinder

7 Inspect outside diameters of parts ground on centerless grinder
8 Perform basic centerless grinder maintenance

DUTY P: Operating Electrical Discharge Machines (EDM)

TASKS:
1 Perform internal rough and finish cuts
2 Perform external rough and finish cuts
3 Perform profile rough and finish cuts
4 Perform repair work
5 Inspect parts machined with EDM
6 Perform basic EDM maintenance

DUTY Q: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Dispose of scrap metal chips, shavings, trash and waste
2 Clean and maintain work area and leave in safe condition
3 Clean and store hand tools, cutters, fixtures, jigs and attachments
4 Store grinding wheels
5 Follow tool crib procedures
6 Inspect and remove, replace, or adjust machine guards
7 Scrape and paint machines
8 Report problems to supervisor
9 Complete time cards
10 Complete job status reports
11 Make equipment failure reports
12 Determine basic maintenance procedures using manuals
13 Participate in participative management program (Quality Circles)

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

DUTY A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident report
4 Inspect work area and equipment for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committee
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation (CPR) techniques
11 Comply with safety requirements for working around automated systems
12 Participate in safety training program
13 Conduct safety training program

DUTY B: Performing Benchwork Operations

TASKS:
1 Cut threads with taps and dies
2 Remove threaded fasteners and repair threads
3 Deburr parts
4 Polish parts using coated abrasives
5 Sharpen and polish tools using abrasive stones
6 Finish parts with hand grinders
7 Determine high spots using pigment
8 Remove high spots
9 Polish and buff parts with portable hand tools
10 Lap and fit parts
11 Disassemble, assemble and straighten parts using arbor press
12 Cut keyway with broach
13 Set up and use hone to apply specified surface in hole
14 Disassemble, fit and reassemble parts
15 Lift and position workpiece using hoists
16 Assemble jigs and fixtures
17 Repair jigs and fixtures
18 Plan assembly operations
19 Supervise assembly operations
20 Work materials with hand tools
21 Work materials with portable power tools

DUTY C: Performing Precision Measurement

TASKS:
1 Measure parts with semi-precision measuring tools
2 Inspect parts with precision measuring tools
3 Inspect parts with comparison measuring tools

4 Inspect parts using go/no go gages
5 Measure parts using dial calipers
6 Measure parts using vernier measuring tools
7 Measure parts using outside micrometers
8 Measure parts using inside micrometers
9 Measure parts using depth micrometers
10 Measure parts using special micrometers
11 Measure parts using telescoping gages
12 Measure parts using small hole gages
13 Measure parts using bore gages
14 Inspect parts using radius gages
15 Set up and inspect parts using dial indicators
16 Measure parts using optical comparators
17 Measure parts with height gage
18 Measure angles using sine bar
19 Measure angles, arcs and locations from reference point
20 Measure threads
21 Measure tapers
22 Inspect keyways
23 Measure gears
24 Inspect surface finish of parts
25 Calibrate and use indicating micrometers
26 Calibrate precision measuring tools
27 Measure parts using mechanical measuring tools
28 Measure parts using electronic measuring tools
29 Measure parts using special measuring tools
30 Clean and store precision measuring tools
31 Perform first piece inspection
32 Inspect parts according to quality control and inspection standards and procedures
33 Monitor reports of discrepancy or rejects during production process
34 Conduct quality tests under differing environmental conditions
35 Verify dimensions
36 Verify alignments
37 Verify clearances
38 Inspect machined parts
39 Inspect assemblies
40 Inspect parts with metric measuring instruments

DUTY D: Performing Layouts

TASKS: 1 Analyze specifications
2 Compute layout dimensions
3 Plan layout operations
4 Calculate reference points
5 Calculate angles from reference point
6 Calculate arcs from reference point
7 Calculate locations from reference point

8 Verify workpiece specifications
9 Lay out reference points
10 Lay out angles, arcs and locations from reference point
11 Label workpiece
12 Perform semi-precision layouts
13 Perform precision layouts from blueprints
14 Transfer layouts from models
15 Verify layouts
16 Supervise layout operations

DUTY E: Operating Saws

TASKS:
1 Remove and replace saw blades
2 Cut and weld bandsaw blades
3 Calculate and set cutting speed and feed rate for sawing
4 Saw straight, curved and irregular lines on vertical band saws
5 Saw material to layout with vertical band saw
6 Set up and use vertical band saw for interior contour sawing
7 Set up and use vertical band saw to file parts
8 Cut straight lines on vertical band saw using automatic feed
9 Cut angles on vertical band saw by tilting table
10 Set up and use jigs and fixtures for special sawing operations
11 Slot, groove, miter and trim parts on saw
12 Set up and use stops and guides to control dimension of cuts
13 Set up and use automatic bar feed mechanism for production work
14 Set up and use horizontal band saw for production work
15 Set up and use power hack saw for production work
16 Set up and use circular saw for production work
17 Set up and use friction saw for production work
18 Set up and use rubber disk saw for production work
19 Use and maintain coolant system for sawing
20 Perform basic saw maintenance
21 Plan sequence of sawing operations

DUTY F: Operating Drilling Machines

TASKS:
1 Select drills using drill chart
2 Use and maintain coolant system for drilling
3 Change drills and tool holders
4 Calculate and set drilling speeds, feeds and depth of cut

5 Align workpiece, jigs and fixtures with drill spindle
6 Align tools with drill guide bushings
7 Center drill and drill holes to size
8 Countersink, counterbore and spot face parts to specifications
9 Drill blind holes to specifications
10 Drill deep holes to specifications
11 Drill holes to specifications using special drills
12 Thread parts using tapping attachment
13 Ream holes to size
14 Burnish parts to specifications
15 Drill holes at angle by tilting head or table
16 Position spindle over hole location by swinging radial arm
17 Sharpen drills
18 Perform basic drilling machine maintenance
19 Plan sequence of drilling operations
20 Set up drill press
21 Set up radial drill to drill large workpieces
22 Set up precision drills
23 Set up special drilling machines

DUTY G: Operating Bench Grinders

TASKS:
1 Change and dress bench grinding wheels
2 Sharpen and recondition hand tools
3 Grind lathe turning tools
4 Grind lathe form tools
5 Grind lathe threading tools
6 Grind lathe cut-off tools
7 Grind lathe boring tools
8 Sharpen carbide tools
9 Perform basic bench grinder maintenance

DUTY H: Operating Lathes

TASKS:
1 Calculate and set lathe speeds, feeds and depth of cut
2 Use and maintain coolant system on lathe
3 Face and turn parts in 3-jaw chuck
4 Machine parts between centers
5 Indicate and machine parts in 4-jaw chuck
6 Machine parts using collet chucks
7 Machine parts using faceplate
8 Perform forming operations
9 Perform knurling operations
10 Center drill and drill parts
11 Bore, face and recess internal diameters
12 Ream holes to specifications
13 Undercut diameters and shoulders
14 Machine eccentric diameters
15 Manufacture springs

16 Cut off parts
17 Align lathe centers
18 Calculate tapers
19 Turn tapers
20 Machine internal tapers
21 Thread external diameters
22 Thread internal diameters
23 Repair threads
24 Cut special thread forms
25 Hold dimensions using feed, precision and indicator stops on lathe
26 Hold dimensions using digital readout on lathe
27 Machine parts using carbide tooling
28 Machine parts using ceramic tooling
29 Machine parts using steady rest
30 Machine long parts using follower rest
31 Machine parts using jigs and fixtures
32 Machine radii
33 Duplicate parts using tracing attachment
34 Grind parts using tool post grinder
35 Machine parts using quick change tooling system
36 Identify machining problems, determine the cause and correct problems
37 Perform basic lathe maintenance
38 Plan sequence of lathe operations
39 Set up engine lathe
40 Set up high speed lathe for secondary operations
41 Set up bar turret lathe for production work
42 Set up chucking lathe for production work

DUTY I: Operating Vertical Milling Machines

TASKS:
1 Calculate and set speeds, feeds and depth of cut for vertical mill
2 Align the vertical milling machine head
3 Align workpiece, work holding devices, jigs and fixtures on vertical mill
4 Use and maintain coolant system on milling machine
5 Change tool holders and cutters on vertical mill
6 Establish zero reference point on workpiece to be machined
7 Hold dimensions using table and precision stops on vertical mill
8 Hold dimensions using digital readout on vertical mill
9 Machine parts using end milling cutters on vertical mill
10 Machine parts using carbide milling cutters on vertical mill
11 Machine parts using ceramic milling cutters on vertical mill
12 Machine parts using conventional and climb milling on vertical mill
13 Machine parts square on vertical mill
14 Machine closed pockets on vertical mill

15 Machine angles on vertical mill
16 Machine radii using form milling cutter on vertical mill
17 Machine keyways on vertical mill
18 Machine "T" slots on vertical mill
19 Machine dovetails on vertical mill
20 Center drill, drill and ream holes on vertical mill
21 Tap holes on vertical mill
22 Bore, face and recess diameters using boring head
23 Set up and use jigs and fixtures on vertical mill
24 Solve indexing problems
25 Mill multiple surfaces using indexing fixture on vertical mill
26 Mill multiple surfaces using dividing head on vertical mill
27 Mill radii using rotary table
28 Drill hole patterns using rotary table
29 Mill angles using rotary table
30 Duplicate contours using tracing attachment
31 Identify milling problems, determine causes and correct problems
32 Perform basic vertical milling machine maintenance
33 Plan sequence of vertical milling operations
34 Set up vertical milling machine for manual operations
35 Set up vertical milling machine for automatic operations

DUTY J: Operating Horizontal Milling Machines

TASKS:
1 Calculate and set milling speeds, feeds and depth of cut for horizontal mill
2 Align workpiece, work holding devices, jigs and fixtures on horizontal mill
3 Change arbors and cutters on horizontal mill
4 Hold dimensions using table and precision stops on horizontal mill
5 Hold dimensions using digital readouts on horizontal mill
6 Machine parts using conventional and climb milling on horizontal mill
7 Machine parts using carbide insert cutters on horizontal mill
8 Machine parts using ceramic cutting tools on horizontal mill
9 Perform slab milling
10 Perform gang milling
11 Perform straddle milling
12 Mill parts square using horizontal mill
13 Mill angles on horizontal mill
14 Machine keyways on horizontal mill
15 Machine deep slots on horizontal mill
16 Cut off parts using horizontal mill
17 Perform gear calculations

18 Machine gears on horizontal mill using dividing head
19 Machine splines on horizontal mill using dividing head
20 Machine rack on horizontal mill
21 Machine multiple surfaces using indexing fixture on horizontal mill
22 Perform basic horizontal milling machine maintenance
23 Plan sequence of horizontal milling operations
24 Set up horizontal milling machine for manual operations
25 Set up horizontal milling machine for automatic operations

DUTY K: Operating Boring Machines

TASKS:
1 Calculate and set speeds, feeds and depth of cut on boring machine
2 Align workpiece, work holding devices, jigs and fixtures on boring machine
3 Use and maintain coolant system on boring machine
4 Change cutters and tool holders on boring machine
5 Hold dimensions using table and precision stops on boring machine
6 Hold dimensions using digital readout on boring machine
7 Establish zero reference point on workpiece
8 Center drill, drill and ream holes on boring machine
9 Countersink, counterbore and spot face holes on boring machine
10 Tap holes on boring machine
11 Bore, face and recess internal surfaces on boring machine
12 Machine external surfaces on boring machine
13 Identify boring machine problems, determine causes and solve problems
14 Perform basic boring machine maintenance
15 Plan sequence of boring machine operations
16 Set up boring machine for manual operations
17 Set up boring machine for automatic operations

DUTY L: Operating Surface Grinders

TASKS:
1 Select grinding wheel using manufacturers' wheel data charts
2 Inspect, mount and dress surface grinding wheels
3 Calculate and set surface grinding feeds and depth of cut
4 Maintain grinding coolant system
5 Grind parallel surfaces on surface grinder
6 Grind parts square on surface grinder

7 Grind vertical surface on surface grinder
8 Grind angles on surface grinder
9 Grind radii on surface grinder
10 Grind profiles on surface grinder
11 Remove warp using surface grinder
12 Cut off parts on surface grinder
13 Inspect ground parts
14 Perform basic surface grinder maintenance
15 Plan sequence of surface grinder operations
16 Set up surface grinder for manual operations
17 Set up surface grinder for automatic operations

DUTY M: Operating Inside Diameter (I.D.) Grinders

TASKS:
1 Inspect, mount and dress I.D. grinding wheels
2 Calculate and set I.D. grinding speeds, feeds and depth of cut
3 Parallel grind inside diameters
4 Grind to internal shoulder
5 Grind internal taper
6 Grind internal radius
7 Grind internal recess
8 Grind internal angle
9 Face grind internal shoulder
10 Grind blind hole
11 Grind through parts
12 Inspect inside diameters of ground parts
13 Perform basic I.D. grinder maintenance
14 Plan sequence of I.D. grinder operations
15 Set up I.D. grinder for manual operations
16 Set up I.D. grinder for automatic operations

DUTY N: Operating Outside Diameter (O.D.) Grinders

TASKS:
1 Inspect, mount and dress O.D. grinding wheels
2 Calculate and set O.D. grinding speeds, feeds and depth of cut
3 Align O.D. grinder head, table and fixtures
4 Parallel grind outside diameters on O.D. grinder
5 Grind to external shoulder on O.D. grinder
6 Grind external taper on O.D. grinder
7 Grind external radius on O.D. grinder
8 Grind external angle on O.D. grinder
9 Plunge grind external diameter on O.D. grinder
10 Grind parts between centers
11 Grind parts using collet chucks
12 Grind parts using other work holding devices
13 Grind parts using steady rest
14 Grind parts using follower rest
15 Grind complex profile on O.D. grinder
16 Inspect the outside diameters of parts ground on O.D. grinder
17 Perform basic O.D. grinder maintenance
18 Plan sequence of O.D. grinder operations

19 Set up O.D. grinder for manual operations
20 Set up O.D. grinder for automatic operations

DUTY O: Operating Centerless Grinders

TASKS:
1 Inspect, mount and balance centerless grinding wheels
2 Dress centerless grinding wheels and regulating wheels
3 Calculate and set centerless grinding speeds, feeds and depth of cut
4 Parallel grind outside diameters on centerless grinder
5 Grind to external shoulder on centerless grinder
6 Grind external taper on centerless grinder
7 Grind external radius on centerless grinder
8 Grind external angle on centerless grinder
9 Plunge grind external diameter on centerless grinder
10 Plunge grind complex profile on centerless grinder
11 Inspect outside diameters of parts ground on centerless grinder
12 Perform basic centerless grinder maintenance
13 Plan sequence of centerless grinder operations
14 Set up centerless grinder

DUTY P: Operating Tool and Cutter Grinders

TASKS:
1 Select, inspect, mount and dress wheels on tool and cutter grinder
2 Align workhead and work holding devices on tool and cutter grinder
3 Calculate and set speeds, feeds and depth of cut on tool and cutter grinder
4 Grind plain milling cutters
5 Grind staggered tooth milling cutters
6 Grind form relieved milling cutters
7 Grind end mills
8 Grind helical milling cutters
9 Grind angular milling cutters
10 Sharpen drills
11 Grind step drills
12 Grind straight reamers
13 Grind tapered reamers
14 Grind taps
15 Grind set of thread chasers
16 Grind boring bars
17 Grind lathe turning tools
18 Grind lathe form tools
19 Grind complex profiles
20 Grind carbide tools and cutters
21 Inspect cutter clearance angles

22 Identify grinding problems, determine causes and solve problems
23 Perform basic tool and cutter grinder maintenance
24 Plan sequence of tool and cutter grinder operations
25 Set up tool and cutter grinder for manual operations
26 Set up tool and cutter grinder for automatic operations

DUTY Q: Operating Electrical Discharge Machines (EDM)

TASKS:
1 Machine EDM electrodes to job specifications
2 Mount EDM electrodes in holder
3 Position workpiece on table or fixture
4 Align work and check for clearance
5 Calculate and set feed rate and depth of cut
6 Select electrical discharge circuit
7 Select method for using dilective fluid
8 Perform internal rough and finish cuts
9 Perform external rough and finish cuts
10 Perform profile rough and finish cuts
11 Perform repair work
12 Inspect parts machined with EDM
13 Identify EDM problems, determine causes and solve problems
14 Perform basic EDM maintenance
15 Plan sequence of EDM operations
16 Set up wire EDM machine
17 Set up electrical discharge machine
18 Set up and operate portable EDM machine

DUTY R: Selecting Materials

TASKS:
1 Interpret color codes, numbering systems and classification systems of materials (ie. AISI, SAE)
2 Select material for job
3 Identify metals using spark test
4 Identify metals using variety of tests
5 Identify materials

DUTY S: Performing Heat Treatment of Metals

TASKS:
1 Test hardness of metals
2 Perform non-destructive testing
3 Perform destructive testing
4 Harden metals to job specifications
5 Temper metals to job specifications
6 Anneal metals to job specifications
7 Normalize metals to job specifications
8 Case harden metals to job specifications

DUTY T: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Dispose of scrap metal chips, shavings, trash and waste
2 Clean and maintain work area and leave in safe condition
3 Clean and store hand tools, cutters, fixtures, jigs and attachments
4 Store grinding wheels
5 Follow tool crib procedures
6 Inspect and remove, replace, or adjust machine guards
7 Scrape and paint machines
8 Report problems to supervisor
9 Complete time cards
10 Complete job status reports
11 Make equipment failure reports
12 Read job orders and process sheets to determine tooling and set up information
13 Determine basic maintenance procedures using manuals
14 Participate in participative management program (Quality Circles)

DUTY U: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Select most productive machine tool and tooling for job
4 Coordinate workers with work to be done
5 Write work schedules
6 Schedule and control shop flow of jobs
7 Maintain files
8 Maintain production records
9 Maintain labor records
10 Review job orders, process sheets and blueprint specifications
11 Issue blueprints, job orders, process sheets and tooling
12 Explain work requirements
13 Write production and progress reports
14 Write technical reports
15 Inventory supplies and equipment
16 Maintain charts, tables, graphs or status boards on work scheduled
17 Submit parts for first piece inspection
18 Conduct in-process inspections
19 Monitor reports of discrepancy or rejects during production process
20 Follow up on end product quality control standards

21 Initiate engineering change notices and rejection reports
22 Write requests for deviation to specifications
23 Check job/time cards
24 Supervise machine use
25 Inspect shop equipment and arrange for maintenance and repair work
26 Coordinate maintenance and repair of shop equipment
27 Plan and implement technical training for employees
28 Train employees to operate mechanical devices
29 Evaluate employee progress and performance
30 Follow up employee reports of problems or equipment failures
31 Interview job applicants
32 Hire workers
33 Dismiss employees
34 Determine work to be done by outside firm
35 Write contract for work with outside firm
36 Conduct meetings

DUTY V: Setting Up Numerical Control/Computer Numerical Control (NC/CNC) Machines

TASKS:
1 Read job orders and process sheets to determine tooling and setup information
2 Mount work holding device
3 Install cutting tools in holders
4 Mount holder and tool on spindle
5 Insert tools and holders in machine magazine
6 Load tools in tool drum
7 Load automatic tool changer
8 Load tools in turret
9 Operate drawbar
10 Dial cutter compensation
11 Mount workpiece
12 Position & secure stock in work holding device
13 Place control tape in reader of control console
14 Load program in computer
15 Index cutting tool to zero point
16 Set controls to operating position and start machine
17 Dry run machine with machine locked
18 Run machine in manual/jog mode to verify cutter path
19 Machine first piece to verify accuracy of setup
20 Machine first piece to verify accuracy of program
21 Change cutting tools
22 Change location of clamps and fixtures
23 Reposition stock on fixture
24 Observe machine operation
25 Verify accuracy of machined workpiece
26 Adjust speeds and feeds for maximum output
27 Identify programming errors
28 Update programs stored in bubble memory
29 Notify supervisor of program errors
30 Identify machine malfunctions

31 Correct minor machine malfunctions
32 Notify supervisor of machine malfunctions
33 Verify workpiece detail identification number
34 Verify type of material of workpiece
35 Notify supervisor of discrepancies in parts
36 Complete machine tool safety setup
37 Establish tolerance requirement
38 Inspect first piece to verify setup

DUTY W: Operating Numerical Control/Computer Numerical Control (NC/CNC) Machines

TASKS:
1 Turn on/off power
2 Call up program in distributed numerical control
3 Place tape in reader
4 Key in program on machine
5 Align holding device with machine axis
6 Clamp dial indicator to tool holder
7 Change tool holder
8 Change or replace cutting tool
9 Adjust tool offset manually
10 Interpret operator related messages on screen
11 Control spindle speed override
12 Control feedrate override
13 Activate automatic cycle mode
14 Interrupt automatic cycle mode manually
15 Set manual mode control
16 Select cycle modifiers
17 Select manual feed/jog mode
18 Adjust cutter compensation
19 Edit program
20 Run segment of program
21 Perform sequence search
22 Interpret status lights
23 Change spindle speed
24 Initiate program restart from zero
25 Interrupt cycle
26 Check cutting fluids
27 Check surface finish
28 Check cut dimension
29 Index turret
30 Differentiate between machine controls
31 Set cycle dwell
32 Modify manual data input program
33 Adjust depth of cut
34 Reset tool cycle time
35 Execute emergency stop
36 Perform milling operations on NC/CNC machine
37 Perform drilling operations on NC/CNC machine
38 Perform boring operations on NC/CNC machine
39 Perform reaming operations on NC/CNC machine
40 Perform broaching operations on NC/CNC machine
41 Perform turning operations on NC/CNC machine

42 Perform forming operations on NC/CNC machine
43 Perform punching operations on NC/CNC machine
44 Perform welding operations with NC/CNC machine
45 Perform painting operations with NC/CNC machine
46 Perform assembly operations with NC/CNC machine

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

TOOL AND DIE MAKER

DUTY A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident report
4 Inspect work area and equipment for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committee
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation (CPR) techniques
11 Comply with safety requirements for working around automated systems
12 Participate in safety training program
13 Conduct safety training program

DUTY B: Performing Benchwork Operations

TASKS:
1 Cut threads with taps and dies
2 Remove threaded fasteners and repair threads
3 Deburr parts
4 Polish parts using coated abrasives
5 Sharpen and polish tools using abrasive stones
6 Finish parts with hand grinders
7 Determine high spots using pigment
8 Remove high spots
9 Polish and buff parts with portable hand tools
10 Lap and fit parts
11 Scrape friction surfaces
12 Disassemble, assemble and straighten parts using arbor press
13 Cut keyway with broach
14 Set up and use hone to apply specified surface in hole
15 Disassemble, fit and reassemble parts
16 Lift and position workpiece using hoists
17 Assemble jigs and fixtures
18 Repair jigs and fixtures
19 Fit and assemble metalworking dies
20 Repair metalworking dies
21 Assemble cutting tools
22 Repair cutting tools
23 Assemble gages
24 Repair gages
25 Repair handtools
26 Plan assembly operations
27 Supervise assembly operations
28 Work materials with hand tools
29 Work materials with portable power tools

DUTY C: Performing Precision Measurement

TASKS:
1 Measure parts with semi-precision measuring tools
2 Inspect parts with precision measuring tools
3 Inspect parts with comparison measuring tools
4 Inspect parts using go/no go gages
5 Measure parts using dial calipers
6 Measure parts using vernier measuring tools
7 Measure parts using outside micrometers
8 Measure parts using inside micrometers
9 Measure parts using depth micrometers
10 Measure parts using special micrometers
11 Measure parts using telescoping gages
12 Measure parts using small hole gages
13 Measure parts using bore gages
14 Inspect parts using radius gages
15 Set up and inspect parts using dial indicators
16 Measure parts using optical comparators
17 Measure parts with height gage
18 Measure angles using sine bar
19 Measure angles, arcs and locations from reference point
20 Measure threads
21 Measure tapers
22 Inspect keyways
23 Measure gears
24 Inspect surface finish of parts
25 Calibrate and use indicating micrometers
26 Calibrate precision measuring tools
27 Measure parts using mechanical measuring tools
28 Measure parts using electronic measuring tools
29 Measure parts using special measuring tools
30 Clean and store precision measuring tools
31 Perform first piece inspection
32 Inspect parts according to quality control and inspection standards and procedures
33 Monitor reports of discrepancy or rejects during production process
34 Conduct quality tests under differing environmental conditions
35 Verify dimensions
36 Verify alignments
37 Verify clearances
38 Inspect machined parts
39 Inspect assemblies
40 Inspect parts with metric measuring instruments

DUTY D: Performing Layouts

TASKS:
1 Analyze specifications
2 Compute layout dimensions
3 Plan layout operations
4 Calculate reference points
5 Calculate angles from reference point
6 Calculate arcs from reference point
7 Calculate locations from reference point
8 Verify workpiece specifications
9 Lay out reference points
10 Lay out angles, arcs and locations from reference point
11 Label workpiece
12 Perform semi-precision layouts
13 Perform precision layouts from blueprints
14 Verify layouts
15 Supervise layout operations

DUTY E: Operating Saws

TASKS:
1 Remove and replace saw blades
2 Cut and weld bandsaw blades
3 Calculate and set cutting speed and feed rate for sawing
4 Saw straight, curved and irregular lines on vertical band saws
5 Saw material to layout with vertical band saw
6 Set up and use vertical band saw for interior contour sawing
7 Set up and use vertical band saw to file parts
8 Cut straight lines on vertical band saw using automatic feed
9 Cut angles on vertical band saw by tilting table
10 Set up and use jigs and fixtures for special sawing operations
11 Slot, groove, miter and trim parts on saw
12 Set up and use stops and guides to control dimension of cuts
13 Use and maintain coolant system for sawing
14 Perform basic saw maintenance
15 Plan sequence of sawing operations

DUTY F: Operating Drilling Machines

TASKS:
1 Select drills using drill chart
2 Use and maintain coolant system for drilling
3 Change drills and tool holders
4 Calculate and set drilling speeds, feeds and depth of cut
5 Align workpiece, jigs and fixtures with drill spindle

6 Align tools with drill guide bushings
7 Center drill and drill holes to size
8 Countersink, counterbore and spot face parts to specifications
9 Drill blind holes to specifications
10 Drill deep holes to specifications
11 Drill holes to specifications using special drills
12 Thread parts using tapping attachment
13 Ream holes to size
14 Burnish parts to specifications
15 Drill holes at angle by tilting head or table
16 Position spindle over hole location by swinging radial arm
17 Sharpen drills
18 Perform basic drilling machine maintenance
19 Plan sequence of drilling operations
20 Set up drill press
21 Set up radial drill to drill large workpieces
22 Set up precision drills
23 Set up special drilling machines

DUTY G: Operating Bench Grinders

TASKS:
1 Change and dress bench grinding wheels
2 Sharpen and recondition hand tools
3 Grind lathe turning tools
4 Grind lathe form tools
5 Grind lathe threading tools
6 Grind lathe cut-off tools
7 Grind lathe boring tools
8 Sharpen carbide tools
9 Perform basic bench grinder maintenance

DUTY H: Operating Lathes

TASKS:
1 Calculate and set lathe speeds, feeds and depth of cut
2 Use and maintain coolant system on lathe
3 Face and turn parts in 3-jaw chuck
4 Machine parts between centers
5 Indicate and machine parts in 4-jaw chuck
6 Machine parts using collet chucks
7 Machine parts using faceplate
8 Perform forming operations
9 Perform knurling operations
10 Center drill and drill parts
11 Bore, face and recess internal diameters
12 Ream holes to specifications
13 Undercut diameters and shoulders
14 Machine eccentric diameters
15 Manufacture springs
16 Cut off parts
17 Align lathe centers

18 Calculate tapers
19 Turn tapers
20 Machine internal tapers
21 Thread external diameters
22 Thread internal diameters
23 Repair threads
24 Cut special thread forms
25 Hold dimensions using feed, precision and indicator stops on lathe
26 Hold dimensions using digital readout on lathe
27 Machine parts using carbide tooling
28 Machine parts using ceramic tooling
29 Machine parts using steady rest
30 Machine long parts using follower rest
31 Machine parts using jigs and fixtures
32 Machine radii
33 Duplicate parts using tracing attachment
34 Grind parts using tool post grinder
35 Machine parts using quick change tooling system
36 Identify machining problems, determine causes and correct problems
37 Perform basic lathe maintenance
38 Plan sequence of lathe operations
39 Set up engine lathe
40 Set up high speed lathe for secondary operations

DUTY I: Operating Vertical Milling Machines

TASKS:
1 Calculate and set speeds, feeds and depth of cut for vertical mill
2 Align the vertical milling machine head
3 Align workpiece, work holding devices, jigs and fixtures on vertical mill
4 Use and maintain coolant system on milling machine
5 Change tool holders and cutters on vertical mill
6 Establish zero reference point on workpiece to be machined
7 Hold dimensions using table and precision stops on vertical mill
8 Hold dimensions using digital readout on vertical mill
9 Machine parts using end milling cutters on vertical mill
10 Machine parts using carbide milling cutters on vertical mill
11 Machine parts using ceramic milling cutters on vertical mill
12 Machine parts using conventional and climb milling on vertical mill
13 Machine parts square on vertical mill
14 Machine closed pockets on vertical mill
15 Machine angles on vertical mill
16 Machine radii using form milling cutter on vertical mill
17 Machine keyways on vertical mill

18 Machine "T" slots on vertical mill
19 Machine dovetails on vertical mill
20 Center drill, drill and ream holes on vertical mill
21 Tap holes on vertical mill
22 Bore, face and recess diameters using boring head
23 Set up and use jigs and fixtures on vertical mill
24 Solve indexing problems
25 Mill multiple surfaces using indexing fixture on vertical mill
26 Mill multiple surfaces using dividing head on vertical mill
27 Mill radii using rotary table
28 Drill hole patterns using rotary table
29 Mill angles using rotary table
30 Duplicate contours using tracing attachment
31 Identify milling problems, determine causes and correct problems
32 Perform basic vertical milling machine maintenance
33 Plan sequence of vertical milling operations
34 Set up vertical milling machine for manual operations
35 Set up vertical milling machine for automatic operations

DUTY J: Operating Horizontal Milling Machines

TASKS:
1 Calculate and set milling speeds, feeds and depth of cut for horizontal mill
2 Align workpiece, work holding devices, jigs and fixtures on horizontal mill
3 Change arbors and cutters on horizontal mill
4 Hold dimensions using table and precision stops on horizontal mill
5 Hold dimensions using digital readouts on horizontal mill
6 Machine parts using conventional and climb milling on horizontal mill
7 Machine parts using carbide insert cutters on horizontal mill
8 Machine parts using ceramic cutting tools on horizontal mill
9 Perform slab milling
10 Perform gang milling
11 Perform straddle milling
12 Mill parts square using horizontal mill
13 Mill angles on horizontal mill
14 Machine keyways on horizontal mill
15 Machine deep slots on horizontal mill
16 Cut off parts using horizontal mill
17 Perform gear calculations
18 Machine gears on horizontal mill using dividing head
19 Machine splines on horizontal mill using dividing head

20 Machine rack on horizontal mill
21 Machine multiple surfaces using indexing fixture on horizontal mill
22 Perform basic horizontal milling machine maintenance
23 Plan sequence of horizontal milling operations
24 Set up horizontal milling machine for manual operations
25 Set up horizontal milling machine for automatic operations

DUTY K: Operating Boring Machines

TASKS:
1 Calculate and set speeds, feeds and depth of cut on boring machine
2 Align workpiece, work holding devices, jigs and fixtures on boring machine
3 Use and maintain coolant system on boring machine
4 Change cutters and tool holders on boring machine
5 Hold dimensions using table and precision stops on boring machine
6 Hold dimensions using digital readout on boring machine
7 Establish zero reference point on workpiece
8 Center drill, drill and ream holes on boring machine
9 Countersink, counterbore and spot face holes on boring machine
10 Tap holes on boring machine
11 Bore, face and recess internal surfaces on boring machine
12 Machine external surfaces on boring machine
13 Identify boring machine problems, determine causes and solve problems
14 Perform basic boring machine maintenance
15 Plan sequence of boring machine operations
16 Set up boring machine for manual operations
17 Set up boring machine for automatic operations

DUTY L: Operating Surface Grinders

TASKS:
1 Select grinding wheel using manufacturers' wheel data charts
2 Inspect, mount and dress surface grinding wheels
3 Calculate and set surface grinding feeds and depth of cut
4 Maintain grinding coolant system
5 Grind parallel surfaces on surface grinder
6 Grind parts square on surface grinder
7 Grind vertical surface on surface grinder
8 Grind angles on surface grinder
9 Grind radii on surface grinder
10 Grind profiles on surface grinder

11 Remove warp using surface grinder
12 Cut off parts on surface grinder
13 Inspect ground parts
14 Perform basic surface grinder maintenance
15 Plan sequence of surface grinder operations
16 Set up surface grinder for manual operations
17 Set up surface grinder for automatic operations

DUTY M: Operating Inside Diameter (I.D.) Grinders

TASKS:
1 Inspect, mount and dress I.D. grinding wheels
2 Calculate and set I.D. grinding speeds, feeds and depth of cut
3 Parallel grind inside diameters
4 Grind to internal shoulder
5 Grind internal taper
6 Grind internal radius
7 Grind internal recess
8 Grind internal angle
9 Face grind internal shoulder
10 Grind blind hole
11 Grind through parts
12 Inspect inside diameters of ground parts
13 Perform basic I.D. grinder maintenance
14 Plan sequence of I.D. grinder operations
15 Set up I.D. grinder for manual operations
16 Set up I.D. grinder for automatic operations

DUTY N: Operating Outside Diameter (O.D.) Grinders

TASKS:
1 Inspect, mount and dress O.D. grinding wheels
2 Calculate and set O.D. grinding speeds, feeds and depth of cut
3 Align O.D. grinder head, table and fixtures
4 Parallel grind outside diameters on O.D. grinder
5 Grind to external shoulder on O.D. grinder
6 Grind external taper on O.D. grinder
7 Grind external radius on O.D. grinder
8 Grind external angle on O.D. grinder
9 Plunge grind external diameter on O.D. grinder
10 Grind parts between centers
11 Grind parts using collet chucks
12 Grind parts using other work holding devices
13 Grind parts using steady rest
14 Grind parts using follower rest
15 Grind complex profile on O.D. grinder
16 Inspect outside diameters of parts ground on O.D. grinder
17 Perform basic O.D. grinder maintenance
18 Plan sequence of O.D. grinder operations
19 Set up O.D. grinder for manual operations
20 Set up O.D. grinder for automatic operations

DUTY O: Operating Centerless Grinders

TASKS:
1 Inspect, mount and balance centerless grinding wheels
2 Dress centerless grinding wheels and regulating wheels
3 Calculate and set centerless grinding speeds, feeds and depth of cut
4 Parallel grind outside diameters on centerless grinder
5 Grind to external shoulder on centerless grinder
6 Grind external taper on centerless grinder
7 Grind external radius on centerless grinder
8 Grind external angle on centerless grinder
9 Plunge grind external diameter on centerless grinder
10 Plunge grind complex profile on centerless grinder
11 Inspect outside diameters of parts ground on centerless grinder
12 Perform basic centerless grinder maintenance
13 Plan sequence of centerless grinder operations
14 Set up centerless grinder

DUTY P: Operating Tool and Cutter Grinders

TASKS:
1 Select, inspect, mount and dress wheels on tool and cutter grinder
2 Align workhead and work holding devices on tool and cutter grinder
3 Calculate and set speeds, feeds and depth of cut on tool and cutter grinder
4 Grind plain milling cutters
5 Grind staggered tooth milling cutters
6 Grind form relieved milling cutters
7 Grind end mills
8 Grind helical milling cutters
9 Grind angular milling cutters
10 Sharpen drills
11 Grind step drills
12 Grind straight reamers
13 Grind tapered reamers
14 Grind taps
15 Grind set of thread chasers
16 Grind boring bars
17 Grind lathe turning tools
18 Grind lathe form tools
19 Grind complex profiles
20 Grind carbide tools and cutters
21 Inspect cutter clearance angles
22 Identify grinding problems, determine causes and solve problems
23 Perform basic tool and cutter grinder maintenance
24 Plan sequence of tool and cutter grinder operations

25 Set up tool and cutter grinder for manual operations
26 Set up tool and cutter grinder for automatic operations

DUTY Q: Operating Jig Grinders

TASKS:
1 Select, inspect, mount and dress wheels on jig grinder
2 Calculate and set speeds, feeds and depth of cut on jig grinder
3 Set diameter of planetary action
4 Set limits of automatic reciprocating wheel feed
5 Establish zero reference point on workpiece
6 Indicate work under spindle center on jig grinder
7 Grind holes on jig grinder
8 Grind contours on jig grinder
9 Set spindle angle for taper grinding
10 Grind tapers on jig grinder
11 Perform basic jig grinder maintenance
12 Plan sequence of jig grinder operations
13 Set up jig grinder

DUTY R: Operating Electrical Discharge Machines (EDM)

TASKS:
1 Machine EDM electrodes to job specifications
2 Mount EDM electrodes in holder
3 Position workpiece on table or fixture
4 Align work and check for clearance
5 Calculate and set feed rate and depth of cut
6 Select electrical discharge circuit
7 Select method for using dilective fluid
8 Perform internal rough and finish cuts
9 Perform external rough and finish cuts
10 Perform profile rough and finish cuts
11 Perform repair work
12 Inspect parts machined with EDM
13 Identify EDM problems, determine causes and solve problems
14 Perform basic EDM maintenance
15 Plan sequence of EDM operations
16 Set up wire EDM machine
17 Set up electrical discharge machine
18 Set up and operate portable EDM machine

DUTY S: Selecting Materials

TASKS:
1 Interpret color codes, numbering systems, and classification systems of materials (ie. AISI, SAE)
2 Select material for job
3 Identify metals using spark test

4 Identify metals using variety of tests
5 Identify materials

DUTY T: Performing Heat Treatment of Metals

TASKS:
1 Test hardness of metals
2 Perform non-destructive testing
3 Perform destructive testing
4 Harden metals to job specifications
5 Temper metals to job specifications
6 Anneal metals to job specifications
7 Normalize metals to job specifications
8 Case harden metals to job specifications

DUTY U: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Dispose of scrap metal chips, shavings, trash and waste
2 Clean and maintain work area and leave in safe condition
3 Clean and store hand tools, cutters, fixtures, jigs and attachments
4 Store grinding wheels
5 Follow tool crib procedures
6 Inspect and remove, replace, or adjust machine guards
7 Report problems to supervisor
8 Complete time cards
9 Complete job status reports
10 Make equipment failure reports
11 Record preventive maintenance activities
12 Record repair activities
13 Read job orders and process sheets to determine tooling and set up information
14 Determine basic maintenance procedures using manuals
15 Participate in participative management program (Quality Circles)

DUTY V: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Select most productive machine tool and tooling for job
4 Coordinate workers with work to be done
5 Write work schedules
6 Schedule and control shop flow of jobs
7 Maintain files
8 Maintain production records
9 Maintain labor records

10 Maintain warranty records
11 Review job orders, process sheets and blueprint specifications
12 Issue blueprints, job orders, process sheets and tooling
13 Explain work requirements
14 Write production and progress reports
15 Write technical reports
16 Inventory supplies and equipment
17 Maintain charts, tables, graphs or status boards on work scheduled
18 Submit parts for first piece inspection
19 Conduct in process inspections
20 Monitor reports of discrepancy or rejects during production process
21 Follow up on end product quality control standards
22 Initiate engineering change notices and rejection reports
23 Write requests for deviation to specifications
24 Check job/time cards
25 Supervise machine use
26 Inspect shop equipment and arrange for maintenance and repair work
27 Coordinate maintenance and repair of shop equipment
28 Plan and implement technical training for employees
29 Train employees to operate mechanical devices
30 Evaluate employee progress and performance
31 Follow up employee reports of problems or equipment failures
32 Interview job applicants
33 Hire workers
34 Dismiss employees
35 Determine work to be done by outside firm
36 Write contract for work with outside firm
37 Conduct meetings

DUTY W: Setting up Numerical Control/Computer Numerical Control (NC/CNC) Machines

TASKS:
1 Read job orders and process sheets to determine tooling and set up information
2 Mount work holding device
3 Install cutting tools in holders
4 Mount holder and tool on spindle
5 Insert tools and holders in machine magazine
6 Load tools in tool drum
7 Load automatic tool changer
8 Load tools in turret
9 Operate drawbar
10 Dial cutter compensation
11 Mount workpiece
12 Position & secure stock in work holding device
13 Place control tape in reader of control console
14 Load program in computer
15 Index cutting tool to zero point

16 Set controls to operating position and start machine
17 Dry run machine with machine locked
18 Run machine in manual/jog mode to verify cutter path
19 Machine first piece to verify accuracy of setup
20 Machine first piece to verify accuracy of program
21 Change cutting tools
22 Change location of clamps and fixtures
23 Reposition stock on fixture
24 Observe machine operation
25 Verify accuracy of machined workpiece
26 Adjust speeds and feeds for maximum output
27 Identify programming errors
28 Update programs stored in bubble memory
29 Notify supervisor of program errors
30 Identify machine malfunctions
31 Correct minor machine malfunctions
32 Notify supervisor of machine malfunctions
33 Verify workpiece detail identification number
34 Verify type of material of workpiece
35 Notify supervisor of discrepancies in parts
36 Complete machine tool safety setup
37 Establish tolerance requirement
38 Inspect first piece to verify setup

DUTY X: Operating Numerical Control/Computer Numerical Control (NC/CNC) Machines

TASKS:
1 Turn on/off power
2 Call up program in distributed numerical control
3 Place tape in reader
4 Key in program on machine
5 Align holding device with machine axis
6 Clamp dial indicator to tool holder
7 Change tool holder
8 Change or replace cutting tool
9 Adjust tool offset manually
10 Interpret operator related messages on screen
11 Control spindle speed override
12 Control feedrate override
13 Activate automatic cycle mode
14 Interrupt automatic cycle mode manually
15 Set manual mode control
16 Select cycle modifiers
17 Select manual feed/jog mode
18 Adjust cutter compensation
19 Edit program
20 Run segment of program
21 Perform sequence search
22 Interpret status lights
23 Change spindle speed
24 Initiate program re-start from zero
25 Interrupt cycle
26 Check cutting fluids
27 Check surface finish

28 Check cut dimension
29 Index turret
30 Differentiate between machine controls
31 Set cycle dwell
32 Modify manual data input program
33 Adjust depth of cut
34 Reset tool cycle time
35 Execute emergency stop
36 Perform milling operations on NC/CNC machine
37 Perform drilling operations on NC/CNC machine
38 Perform boring operations on NC/CNC machine
39 Perform reaming operations on NC/CNC machine
40 Perform broaching operations on NC/CNC machine
41 Perform turning operations on NC/CNC machine
42 Perform forming operations on NC/CNC machine
43 Perform punching operations on NC/CNC machine
44 Perform welding operations with NC/CNC machine
45 Perform painting operations with NC/CNC machine
46 Perform assembly operations with NC/CNC machine

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

PUNCH PRESS OPERATOR

DUTY A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident report
4 Inspect work area and equipment for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committee
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation (CPR) techniques
11 Comply with safety requirements for working around automated systems
12 Participate in safety training program

DUTY B: Performing Benchwork Operations

TASKS:
1 Disassemble, fit and reassemble parts
2 Lift and position workpiece using hoists
3 Work materials with hand tools

DUTY C: Performing Precision Measurement

TASKS:
1 Measure parts with semi-precision measuring tools
2 Inspect parts with precision measuring tools
3 Inspect parts with comparison measuring tools
4 Inspect parts using go/no go gages
5 Measure parts using dial calipers
6 Measure parts using vernier measuring tools
7 Measure parts using outside micrometers
8 Measure parts using inside micrometers
9 Measure parts using depth micrometers
10 Measure parts using special micrometers
11 Set up and inspect parts using dial indicators
12 Measure parts using optical comparators
13 Measure parts with height gage
14 Measure parts using mechanical measuring tools
15 Measure parts using electronic measuring tools
16 Measure parts using special measuring tools
17 Clean and store precision measuring tools
18 Perform first piece inspection
19 Inspect parts according to quality control and inspection standards and procedures
20 Monitor reports of discrepancy or rejects during production process

21 Conduct quality tests under differing environmental conditions
22 Inspect parts with metric measuring instruments

DUTY D: Selecting Materials

TASKS:
1 Select material for job
2 Identify materials

DUTY E: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Dispose of scrap metal chips, shavings, trash and waste
2 Clean and maintain work area and leave in safe condition
3 Clean and store hand tools, cutters, fixtures, jigs and attachments
4 Follow tool crib procedures
5 Inspect and remove, replace or adjust machine guards
6 Scrape and paint machines
7 Report problems to supervisor
8 Complete time cards
9 Complete job status reports
10 Make equipment failure reports
11 Read job orders and process sheets to determine tooling and set up information
12 Determine basic maintenance procedures using manuals
13 Participate in participative management program (Quality Circles)

DUTY F: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Select most productive machine tool and tooling for a job
3 Coordinate workers with work to be done
4 Write work schedules
5 Schedule and control shop flow of jobs
6 Maintain files
7 Maintain production records
8 Maintain labor records
9 Review job orders, process sheets and blueprint specifications
10 Issue blueprints, job orders, process sheets and tooling
11 Explain work requirements
12 Write production and progress reports
13 Write technical reports
14 Inventory supplies and equipment

15 Maintain charts, tables, graphs or status boards on work scheduled
16 Submit parts for first piece inspection
17 Conduct in process inspections
18 Monitor reports of discrepancy or rejects during production process
19 Follow up on end product quality control standards
20 Initiate engineering change notices and rejection reports
21 Write requests for deviation to specifications
22 Check job/time cards
23 Supervise machine use
24 Inspect shop equipment and arrange for maintenance and repair work
25 Coordinate maintenance and repair of shop equipment
26 Plan and implement technical training for employees
27 Train employees to operate mechanical devices
28 Evaluate employee progress and performance
29 Follow up employee reports of problems or equipment failures
30 Dismiss employees

DUTY G: Setting Up Manual Punch Presses

TASKS:
1 Strip press of previous tooling
2 Clean press
3 Review setup sheet and specifications
4 Set up die for change over
5 Install die in press
6 Align die in press
7 Bolt die in press
8 Adjust ram stroke to specifications
9 Mount and align fixtures to press
10 Set material stops
11 Set up air ejectors
12 Inspect and replace guards
13 Set controls to operating position and start press
14 Run press in manual/jog mode to verify clearances
15 Position workpiece in press
16 Adjust workpiece stops and supports
17 Position parts containers
18 Position scrap containers
19 Run first piece to verify setup and conformance to specifications
20 Make necessary adjustments to correct errors
21 Give operator instructions

DUTY H: Operating Manual Punch Presses

TASKS:
1 Place workpiece against stops
2 Place workpiece in fixture
3 Place workpiece in die
4 Operate press
5 Remove part

6 Remove scrap materials
7 Load and move parts containers
8 Count and label parts

DUTY I: Setting Up and Operating Automatic Punch Presses

TASKS:
1 Strip press of previous tooling
2 Clean press
3 Review setup sheet and specifications
4 Install die in press
5 Align die in press
6 Bolt die in press
7 Adjust ram stroke to specifications
8 Mount and align fixtures to press
9 Set material stops
10 Mount form slides
11 Set cams
12 Set up air ejectors
13 Inspect and replace guards
14 Set controls to operating position and start press
15 Run press in manual/jog mode to verify clearances
16 Install parts chutes
17 Position parts containers
18 Position scrap containers
19 Run first piece to verify setup and conformance to specifications
20 Make necessary adjustments to correct errors
21 Start run
22 Input control panel data
23 Monitor control panel data
24 Interpret control panel data

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

DUTY A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident report
4 Inspect work area and equipment for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Correct safety hazards
8 Demonstrate cardiopulmonary resuscitation (CPR) techniques
9 Participate in safety training program

DUTY B: Performing Benchwork Operations

TASKS:
1 Deburr parts
2 Disassemble, fit and reassemble parts
3 Plan assembly operations
4 Work materials with hand tools
5 Work materials with portable power tools
6 Bend metal with box and pan brake
7 Bend sheet metal with cornice brake
8 Bend metal with power brake
9 Cut metal with power shear
10 Notch materials
11 Roll cylindrical metal shapes
12 Work materials with hydraulic iron worker

DUTY C: Performing Precision Measurement

TASKS:
1 Measure parts with semi-precision measuring tools
2 Inspect parts with precision measuring tools
3 Inspect parts with comparison measuring tools
4 Inspect assemblies
5 Inspect parts with metric measuring instruments

DUTY D: Performing Layouts

TASKS:
1 Analyze specifications
2 Compute layout dimensions
3 Plan layout operations
4 Calculate reference points
5 Calculate angles from reference point
6 Calculate arcs from reference point
7 Calculate locations from reference point
8 Verify workpiece specifications
9 Lay out reference points
10 Lay out angles, arcs and locations from reference point

11 Label workpiece
12 Perform semi-precision layouts
13 Perform sheet metal layouts from blueprints
14 Perform layouts from templates
15 Transfer layouts from models
16 Verify layouts

DUTY E: Operating Drilling Machines

TASKS:
1 Select drills using drill chart
2 Use and maintain coolant system for drilling
3 Change drills and tool holders
4 Calculate and set drilling speeds, feeds and depth of cut
5 Center drill and drill holes to size
6 Perform basic drilling machine maintenance
7 Plan sequence of drilling operations
8 Set up drill press

DUTY F: Operating Bench Grinders

TASKS:
1 Change and dress bench grinding wheels
2 Sharpen and recondition hand tools
3 Rough grind materials
4 Perform basic bench grinder maintenance

DUTY G: Selecting Materials

TASKS:
1 Interpret color codes, numbering systems, and classification systems of materials (ie. AISI, SAE)
2 Select material for job
3 Identify materials

DUTY H: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Dispose of scrap metal chips, shavings, trash and waste
2 Clean and maintain work area and leave in safe condition
3 Clean and store hand tools, cutters, fixtures, jigs and attachments
4 Follow tool crib procedures
5 Report problems to supervisor
6 Complete time cards
7 Complete job status reports
8 Make equipment failure reports
9 Determine basic maintenance procedures using manuals
10 Participate in participative management program (Quality Circles)

DUTY I: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Select most productive machine tool and tooling for job
4 Coordinate workers with work to be done
5 Write work schedules
6 Schedule and control shop flow of jobs
7 Maintain files
8 Maintain production records
9 Maintain labor records
10 Review job orders, process sheets and blueprint specifications
11 Issue blueprints, job orders, process sheets and tooling
12 Explain work requirements
13 Write production and progress reports
14 Write technical reports
15 Inventory supplies and equipment
16 Maintain charts, tables, graphs or status boards on work scheduled
17 Check job/time cards
18 Inspect shop equipment and arrange for maintenance and repair work
19 Coordinate maintenance and repair of shop equipment
20 Plan and implement technical training for employees
21 Train employees to operate mechanical devices
22 Evaluate employee progress and performance
23 Follow up employee reports of problems or equipment failures

DUTY J: Fastening and/or Joining Sheet Metal

TASKS:
1 Rivet sheet metal with tinners rivets
2 Rivet sheet metal with pop rivets
3 Fasten materials using sheet metal screws

DUTY K: Fabricating Sheet Metal

TASKS:
1 Construct single hem
2 Construct double hem
3 Construct single lap seam
4 Construct double lap seam
5 Construct standing seam (air duct connections)
6 Contruct Pittsburgh lock seam
7 Construct grooved seam
8 Construct drive clip (air duct connection)
9 Construct S-cleat (air duct connection)
10 Fabricate rectangular straight duct

11 Fabricate rectangular radius throat and radius heel duct elbow
12 Fabricate rectangular square throat and square heel duct elbow
13 Fabricate rectangular duct ogee offset
14 Fabricate rectangular duct transition
15 Fabricate rectangular shoe tap
16 Fabricate round straight duct
17 Fabricate round duct elbow
18 Fabricate round duct offset
19 Fabricate round duct taper (transition)
20 Fabricate single wall equipment casing/housing
21 Fabricate double wall equipment casing/housing
22 Fabricate companion angle
23 Fabricate flanged duct section

DUTY L: Fabricating Architectural/Roofing Sheet Metal

TASKS:
1 Fabricate ogee gutter
2 Fabricate flashing
3 Fabricate roof coping
4 Fabricate gravel stop fascia
5 Fabricate metal siding panel
6 Fabricate column cover
7 Fabricate metal ceiling panel

DUTY M: Fabricating Specialty Sheet Metal

TASKS:
1 Fabricate rectangular single blade damper in frame
2 Fabricate rectangular multi-blade damper in frame
3 Fabricate rectangular tube
4 Fabricate round tube
5 Fabricate belt guard
6 Fabricate breeching
7 Fabricate rectangular fiberglass duct
8 Fabricate lagging for insulated breeching

DUTY N: Fabricating Food and Beverage Dispensing Equipment

TASKS
1 Fabricate sink
2 Fabricate shelf
3 Fabricate cabinet shell
4 Fabricate cabinet drawer
5 Fabricate cabinet sliding door
6 Fabricate cabinet hinge door
7 Assemble cabinet components
8 Fabricate range hood

DUTY O: Installing Sheet Metal Systems

TASKS:
1 Install rectangular duct system
2 Install round duct system

3 Install single wall equipment casing/housing
4 Install double wall equipment casing/housing
5 Install breeching
6 Install belt guards
7 Install ogee gutter
8 Install flashing
9 Install coping
10 Install gravel stop fascia
11 Install louver

DUTY P: Performing Oxy-Fuel Welding (OAW)

TASKS:
1 Select oxy-fuel welding (OAW) gas and filler metal according to job
2 Change cylinders and adjust oxy-fuel manifold
3 Set up portable oxy-acetylene welding equipment
4 Perform minor maintenance on oxy-acetylene welding equipment (OAW)
5 Braze ferrous metals
6 Braze non-ferrous metals
7 Solder copper
8 Solder stainless steel
9 Solder materials

DUTY Q: Performing Shielded Metal Arc Welding (SMAW)

TASKS:
1 Select shielded metal arc welding (SMAW) equipment and electrodes according to job
2 Set up shielded metal arc welding equipment
3 Perform minor maintenance on shielded metal arc welding equipment
4 Weld 3/16" mild steel in flat position (1F,1G)
5 Weld 3/16" mild steel in horizontal position (2F,2G)
6 Weld 3/16" mild steel in vertical up/down positions (3F,3G)
7 Weld stainless steel with shielded metal arc welding equipment (SMAW)

DUTY R: Performing Gas Metal Arc Welding (GMAW)

TASKS:
1 Select gas metal arc welding (GMAW) equipment, filler metal and gases according to job
2 Set up gas metal arc welding equipment
3 Perform minor maintenance on gas metal arc welding equipment
4 Weld 3/16" mild steel in flat position (1F,1G)
5 Weld 3/16" mild steel in horizontal position (2F,2G)
6 Weld 3/16" mild steel in vertical up/down positions (3F, 3G)
7 Weld 16 gauge stainless steel in flat position (1F,1G)

8 Weld 16 gauge stainless steel in horizontal position (2F,2G)
9 Weld 16 gauge stainless steel in vertical up/down positions (3F, 3G)
10 Weld 1/4" aluminum in flat position (1F,1G)
11 Weld 1/4" aluminum in horizontal position (2F,2G)

DUTY S: Performing Gas Tungsten Arc Welding (GTAW)

TASKS:
1 Select gas tungsten arc welding (GTAW) equipment, electrodes, gases and filler metal according to job
2 Set up gas tungsten arc welding equipment
3 Perform minor maintenance on gas tungsten arc welding equipment
4 Weld 1/8" mild steel in flat position (1F,1G)
5 Weld 1/8" mild steel in horizontal position (2F,2G)
6 Weld 1/8" mild steel in vertical up/down positions (3F,3G)
7 Weld 16 gauge stainless steel in flat position (1F,1G)
8 Weld 16 gauge stainless steel in horizontal position (2F,2G)
9 Weld 11 gauge aluminum in flat position (1F,1G)
10 Weld 11 gauge aluminum in horizontal position (2F,2G)
11 Weld 11 gauge aluminum in vertical up/down positions (3F,3G)

DUTY T: Performing Resistance Welding

TASKS:
1 Select resistance welding equipment according to job
2 Set up resistance welding equipment
3 Perform minor maintenance on resistance welding equipment
4 Weld materials by spot welding

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

COMBINATION WELDER

DUTY A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident report
4 Inspect work area and equipment for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committee
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation (CPR) techniques
11 Comply with safety requirements for working around automated systems
12 Participate in safety training program

DUTY B: Performing Benchwork Operations

TASKS:
1 Rough finish parts with hand filing machines
2 Rough grind parts with hand grinders
3 Finish parts with hand grinders
4 Disassemble, assemble and straighten parts using arbor press
5 Disassemble, fit and reassemble parts
6 Lift and position workpiece using hoists
7 Plan assembly operations
8 Work materials with hand tools
9 Work materials with portable power tools
10 Bend metal with box and pan brake
11 Bend metal with power brake
12 Cut metal with power shear
13 Notch materials
14 Roll cylindrical metal shapes
15 Chip slag
16 Work materials with hydraulic iron worker
17 Bevel pipe
18 Position materials to be welded with positioners
19 Position weldments

DUTY C: Performing Precision Measurement

TASKS:
1 Measure parts with semi-precision measuring tools
2 Inspect parts with precision measuring tools
3 Inspect parts with comparison measuring tools
4 Clean and store precision measuring tools
5 Inspect parts according to quality control and inspection standards and procedures
6 Monitor reports of discrepancy or rejects during the production process

7 Conduct quality tests under differing environmental conditions
8 Inspect assemblies
9 Inspect parts with metric measuring instruments

DUTY D: Performing Layouts

TASKS:
1 Analyze specifications
2 Compute layout dimensions
3 Plan layout operations
4 Calculate reference points
5 Calculate angles from reference point
6 Calculate arcs from reference point
7 Calculate locations from reference point
8 Verify workpiece specifications
9 Lay out reference points
10 Lay out angles, arcs and locations from a reference point
11 Label workpiece
12 Perform semi-precision layouts
13 Perform precision layouts from blueprints
14 Perform layouts from templates
15 Perform pipe layouts
16 Verify layouts
17 Supervise layout operations

DUTY E: Operating Saws

TASKS:
1 Remove and replace saw blades
2 Cut and weld bandsaw blades
3 Calculate and set cutting speed and feed rate for sawing
4 Saw straight, curved and irregular lines on vertical band saws
5 Saw material to layout with vertical band saw
6 Slot, groove, miter and trim parts on saw
7 Set up and use stops and guides to control dimension of cuts
8 Set up and use horizontal band saw for production work
9 Set up and use power hack saw for production work
10 Set up and use circular saw for production work
11 Set up and use friction saw for production work
12 Set up and use rubber disk saw for production work
13 Use and maintain coolant system for sawing
14 Perform basic saw maintenance
15 Plan sequence of sawing operations

DUTY F: Operating Drilling Machines

TASKS:
1 Select drills using drill chart
2 Use and maintain coolant system for drilling
3 Change drills and tool holders
4 Calculate and set drilling speeds, feeds and depth of cut
5 Center drill and drill holes to size
6 Perform basic drilling machine maintenance
7 Plan sequence of drilling operations
8 Set up drill press

DUTY G: Operating Bench Grinders

TASKS:
1 Change and dress bench grinding wheels
2 Sharpen and recondition hand tools
3 Rough grind materials
4 Perform basic bench grinder maintenance

DUTY H: Selecting Materials

TASKS:
1 Interpret color codes, numbering systems, and classification systems of materials (ie. AISI, SAE)
2 Select material for job
3 Identify metals using spark test
4 Identify materials

DUTY I: Performing Heat Treatment of Metals

TASKS:
1 Harden metals to job specifications
2 Temper metals to job specifications
3 Anneal metals to job specifications
4 Normalize metals to job specifications
5 Case harden metals to job specifications
6 Preheat and post-heat metals to control distortion/warpage during welding

DUTY J: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Dispose of scrap metal chips, shavings, trash and waste
2 Clean and maintain work area and leave in safe condition
3 Clean and store hand tools, cutters, fixtures, jigs and attachments
4 Follow tool crib procedures
5 Inspect and remove, replace, or adjust machine guards
6 Report problems to supervisor
7 Complete time cards
8 Complete job status reports

9 Make equipment failure reports
10 Read job orders and process sheets to determine tooling and set up information
11 Determine basic maintenance procedures using manuals
12 Participate in participative management program (Quality Circles)

DUTY K: Performing Oxy-Fuel Welding (OAW)

TASKS:
1 Select oxy-fuel welding (OAW) gas and filler metal according to job
2 Change cylinders and adjust oxy-fuel manifold
3 Set up portable oxy-acetylene welding equipment
4 Perform minor maintenance on oxy-acetylene welding equipment (OAW)
5 Weld 1/8" mild steel in flat position (1F,1G)
6 Weld 1/8" mild steel in horizontal position (2F,2G)
7 Weld 1/8" mild steel in vertical position (3F,3G)
8 Weld 1/8" mild steel in overhead position (4F,4G)
9 Braze ferrous metals
10 Braze non-ferrous metals
11 Silver braze ferrous metals
12 Silver braze non-ferrous metals
13 Heat and bend metal to specifications
14 Heat metal parts to assist in removal
15 Build up surfaces
16 Hard face surfaces

DUTY L: Performing Thermal Cutting Operations

TASKS:
1 Set up portable oxy-fuel cutting equipment
2 Cut steel by hand using oxy-fuel cutting equipment
3 Cut cast iron by hand using oxy-fuel cutting equipment
4 Cut steel with trackcutter using oxy-fuel cutting equipment
5 Cut steel with pipecutter using oxy-fuel cutting equipment
6 Set up pattern cutter
7 Cut steel with single torch pattern cutter
8 Cut steel with multiple torch pattern cutter
9 Set up automatic shape cutter with photocell
10 Cut steel with single torch automatic shape cutter with photocell
11 Cut steel with multiple torch automatic shape cutter with photocell
12 Set up and cut shapes with digital controlled shape cutter (with tape)
13 Set up and cut shapes with digital controlled shape cutter (without tape)

14 Cut and pierce metal with shielded metal arc welding equipment (SMAW)
15 Set up air carbon arc equipment
16 Cut carbon steel with air carbon arc equipment
17 Cut stainless steel with air carbon arc equipment
18 Cut aluminum with air carbon arc equipment
19 Set up plasma arc cutting equipment (PAC)
20 Cut metals by hand using plasma arc cutting equipment (PAC)
21 Cut metals automatically using plasma arc cutting equipment (PAC)

DUTY M: Performing Shielded Metal Arc Welding (SMAW)

TASKS:
1 Select shielded metal arc welding (SMAW) equipment and electrodes according to job
2 Set up shielded metal arc welding equipment
3 Perform minor maintenance on shielded metal arc welding equipment
4 Weld 3/16" mild steel in flat position (1F,1G)
5 Weld 3/16" mild steel in horizontal position (2F,2G)
6 Weld 3/16" mild steel in vertical up/down positions (3F,3G)
7 Weld 3/16" mild steel in overhead position (4F,4G)
8 Weld single vee-groove butt joint on 3/8" steel plate (1G-4G)
9 Weld double vee-groove butt joint on 1" steel plate (1G-4G)
10 Weld 8" schedule 40 steel pipe in 1G position
11 Weld 8" schedule 40 steel pipe in 2G position
12 Weld 8" schedule 40 steel pipe in 5G position
13 Weld 8" schedule 40 steel pipe in 6G position
14 Weld 8" schedule 60 steel pipe in 1G position
15 Weld 8" schedule 60 steel pipe in 2G position
16 Weld 8" schedule 60 steel pipe in 5G position
17 Weld 8" schedule 60 steel pipe in 6G position
18 Weld 8" schedule 60 steel pipe in 1F position
19 Weld 8" schedule 60 steel pipe in 2F position
20 Weld 8" schedule 60 steel pipe in 2FR position
21 Weld 8" schedule 60 steel pipe in 4F position
22 Weld 8" schedule 60 steel pipe in 5F position
23 Weld 8" schedule 40S stainless steel pipe in 6G position
24 Perform stud welding using Nelson method (electric arc/flux/ferrule)
25 Weld stainless steel with shielded metal arc welding equipment (SMAW)

DUTY N: Performing Gas Metal Arc Welding (GMAW)

TASKS:
1 Select gas metal arc welding (GMAW) equipment, filler metal and gases according to job
2 Set up gas metal arc welding equipment
3 Perform minor maintenance on gas metal arc welding equipment
4 Weld 3/16" mild steel in flat position (1F,1G)
5 Weld 3/16" mild steel in horizontal position (2F,2G)
6 Weld 3/16" mild steel in vertical up/down positions (3F, 3G)
7 Weld 3/16" mild steel in overhead position (4F,4G)
8 Weld single vee-groove butt joint on 3/8" steel plate (1G-4G)
9 Weld double vee-groove butt joint on 1" steel plate (1G,4G)
10 Weld 8" schedule 40 steel pipe in 1G position
11 Weld 8" schedule 40 steel pipe in 2G position
12 Weld 8" schedule 40 steel pipe in 5G position
13 Weld 8" schedule 40 steel pipe in 6G position
14 Weld 8" schedule 60 steel pipe in 1G position
15 Weld 8" schedule 60 steel pipe in 2G position
16 Weld 8" schedule 60 steel pipe in 5G position
17 Weld 8" schedule 60 steel pipe in 6G position
18 Weld 8" schedule 60 steel pipe in 1F position
19 Weld 8" schedule 60 steel pipe in 2F position
20 Weld 8" schedule 60 steel pipe in 2FR position
21 Weld 8" schedule 60 steel pipe in 4F position
22 Weld 8" schedule 60 steel pipe in 5F position
23 Weld 8" schedule 40S stainless steel pipe in 6G position
24 Weld 16 gauge stainless steel in flat position (1F,1G)
25 Weld 16 gauge stainless steel in horizontal position (2F,2G)
26 Weld 16 gauge stainless steel in vertical up/down positions (3F, 3G)
27 Weld 16 gauge stainless steel in overhead position (4F,4G)
28 Weld 1/4" aluminum in flat position (1F,1G)
29 Weld 1/4" aluminum in horizontal position (2F,2G)
30 Weld 1/4" aluminum in vertical up/down positions (3F,3G)
31 Weld 1/4" aluminum in overhead position (4F,4G)

DUTY O: Performing Gas Tungsten Arc Welding (GTAW)

TASKS:
1 Select gas tungsten arc welding (GTAW) equipment, electrodes, gases and filler metal according to job
2 Set up gas tungsten arc welding equipment
3 Perform minor maintenance on gas tungsten arc welding equipment

4 Weld 1/8" mild steel in flat position (1F,1G)
5 Weld 1/8" mild steel in horizontal position (2F,2G)
6 Weld 1/8" mild steel in vertical up/down positions (3F,3G)
7 Weld 1/8" mild steel in overhead position (4F,4G)
8 Weld 3" schedule 40 steel pipe in 1G position
9 Weld 4" schedule 10 steel pipe in 6G position
10 Weld 8" schedule 60 steel pipe in 1G position
11 Weld 8" schedule 60 steel pipe in 2G position
12 Weld 8" schedule 60 steel pipe in 5G position
13 Weld 8" schedule 60 steel pipe in 6G position
14 Weld 8" schedule 60 steel pipe in 6G position with plused current
15 Weld 8" schedule 60 steel pipe in 5G position with Grinnell insert
16 Weld 8" schedule 60 steel pipe in 1F position
17 Weld 8" schedule 60 steel pipe in 2F position
18 Weld 8" schedule 60 steel pipe in 2FR position
19 Weld 8" schedule 60 steel pipe in 4F position
20 Weld 8" schedule 60 steel pipe in 5F position
21 Weld 8" schedule 40S stainless steel pipe in 6G position
22 Weld 16 gauge stainless steel in flat position (1F,1G)
23 Weld 16 gauge stainless steel in horizontal position (2F,2G)
24 Weld 16 gauge stainless steel in vertical up/down positions (3F,3G)
25 Weld 16 gauge stainless steel in overhead position (4F, 4G)
26 Weld single vee-groove butt joint on 3/8" steel plate (1G,4G)
27 Weld 11 gauge aluminum in flat position (1F,1G)
28 Weld 11 gauge aluminum in horizontal position (2F,2G)
29 Weld 11 gauge aluminum in vertical up/down positions (3F,3G)
30 Weld 11 gauge aluminum in overhead position (4F,4G)

DUTY P: Performing Flux Core Arc Welding (FCAW)

TASKS: 1 Select flux core arc welding (FCAW) equipment, gases and filler metal according to job
2 Set up flux core arc welding equipment
3 Perform minor maintenence on flux core arc welding equipment
4 Weld 1" steel plate, lap joint in 1F position with external shielded wire
5 Weld 1" steel plate, lap joint in 2F position with external shielded wire
6 Weld 1" steel plate, lap joint in 1F position with self shielded wire

7 Weld 1" steel plate, lap joint in 2F position with self shielded wire
8 Weld 1" steel plate, vee-groove butt joint in 1G position with external shielded wire
9 Weld 1" steel plate, vee-groove butt joint in 2G position with external shielded wire
10 Weld 1/2" steel plate, T-joint in 3G position up with external shielded wire
11 Weld 3/8" steel plate, vee-groove butt joint in 3G position up with external shielded wire
12 Weld 1/4" steel plate, T-joint in 4F position with external shielded wire

DUTY Q: Performing Plasma Arc Welding (PAW)

TASKS:
1 Select plasma arc welding (PAW) equipment, gases and filler metal according to job
2 Set up plasma arc welding equipment
3 Perform minor maintenance on plasma arc welding equipment
4 Weld 16 gauge mild steel in flat position (1F,1G)
5 Weld 16 gauge mild steel in horizontal position (2F,2G)
6 Weld 16 gauge aluminum in flat position (1F,1G)
7 Weld 16 gauge aluminum in horizontal position (2F,2G)
8 Weld 1/8" aluminum in flat position (1F,1G)
9 Weld 1/8" aluminum in horizontal position (2F,2G)
10 Weld 22 gauge stainless steel in flat position (1F,1G)
11 Weld 22 gauge stainless steel in horizontal position (2F,2G)
12 Weld 1/8" stainless steel in flat position (1F,1G)
13 Weld 1/8" stainless steel in horizontal position (2F,2G)

DUTY R: Performing Submerged Arc Welding (SAW)

TASKS:
1 Select submerged arc welding (SAW) equipment, filler metal and flux according to job
2 Set up submerged arc welding equipment
3 Perform minor maintenance on submerged arc welding equipment
4 Weld 1/8" mild steel in flat position (1G) with automatic equipment
5 Weld 1/4" mild steel in flat position (1F) with semi-automatic equipment
6 Weld 1" mild steel, vee-groove butt joint in flat position (1G) with automatic equipment

7 Weld 1/4" mild steel, T-joint in horizontal position (1F) with automatic equipment
8 Weld 1/4" mild steel, lap-joint in horizontal position (1F) with automatic equipment

DUTY S: Performing Resistance Welding

TASKS: 1 Select resistance welding equipment according to job
2 Set up resistance welding equipment
3 Perform minor maintenance on resistance welding equipment
4 Weld materials by spot welding
5 Weld materials by projection welding
6 Weld materials by flash welding
7 Weld materials by seam welding
8 Weld materials by pulsation welding
9 Weld materials by butt welding

DUTY T: Performing Electroslag Welding (ESW)

TASKS: 1 Select electroslag welding (ESW) equipment, filler metal and flux according to job
2 Set up electroslag welding equipment
3 Weld materials using electroslag welding process

DUTY U: Performing Ultrasonic Welding (USW)

TASKS: 1 Set up ultrasonic welding (USW) equipment
2 Perform minor maintenance on ultrasonic equipment
3 Weld materials using ultrasonic welding process

DUTY V: Performing Laser Beam Welding (LBW)

TASKS: 1 Set up laser beam welding (LBW) equipment
2 Weld materials using laser beam welding process

DUTY W: Performing Electron Beam Welding (EBW)

TASKS: 1 Set up electron beam welding (EBW) equipment
2 Weld materials using electron beam welding process

DUTY X: Performing Inertia Welding

TASKS: 1 Set up inertia welding equipment
2 Weld materials using inertia welding process

DUTY Y: Performing Underwater Welding

TASKS:
1 Select equipment and electrodes for underwater welding according to job
2 Set up underwater welding equipment
3 Weld materials underwater in various positions (1F-4F)
4 Select equipment, gases and electrodes for underwater cutting according to job
5 Set up underwater cutting equipment
6 Cut materials underwater

DUTY Z: Performing Plastic Welding

TASKS:
1 Select plastic welding equipment and gases according to job
2 Set up plastic welding equipment
3 Weld plastics using hot gas method
4 Weld plastics using heated tool method
5 Weld plastics using induction method

DUTY AA: Testing Welds

TASKS:
1 Select destructive or non-destructive methods for testing welds
2 Perform visual inspection of welded materials
3 Perform liquid penetrant tests on welded materials
4 Perform hardness tests on welded materials
5 Perform guided bend tests on welded materials
6 Perform tensile tests on welded materials
7 Perform impact tests on welded materials
8 Perform radiographic tests on welded materials
9 Perform ultrasonic tests on welded materials
10 Perform magnetic particle tests on welded materials

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

DUTY A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident report
4 Inspect work area and equipment for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committee
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation (CPR) techniques
11 Comply with safety requirements for working around automated systems
12 Participate in safety training program

DUTY B: Performing Benchwork Operations

TASKS:
1 Cut threads with taps and dies
2 Remove threaded fasteners and repair threads
3 Deburr parts
4 Polish parts using coated abrasives
5 Sharpen and polish tools using abrasive stones
6 Rough grind parts with hand grinders
7 Finish parts with hand grinders
8 Determine high spots using pigment
9 Remove high spots
10 Polish and buff parts with portable hand tools
11 Lap and fit parts
12 Scrape friction surfaces
13 Disassemble, assemble and straighten parts using arbor press
14 Cut keyway with broach
15 Disassemble, fit and reassemble parts
16 Lift and position workpiece using hoists
17 Plan assembly operations
18 Work materials with hand tools
19 Work materials with portable power tools

DUTY C: Performing Precision Measurement

TASKS:
1 Measure parts with semi-precision measuring tools
2 Inspect parts with precision measuring tools
3 Inspect parts with comparison measuring tools
4 Set up and inspect parts using dial indicators
5 Measure threads
6 Measure tapers

7 Inspect keyways
8 Measure gears
9 Inspect the surface finish of parts
10 Calibrate precision measuring tools
11 Clean and store precision measuring tools
12 Verify dimensions
13 Verify alignments
14 Verify clearances
15 Inspect machined parts
16 Inspect assemblies
17 Inspect parts with metric measuring instruments

DUTY D: Performing Layouts

TASKS:
1 Analyze specifications
2 Compute layout dimensions
3 Plan layout operations
4 Calculate reference points
5 Calculate angles from reference point
6 Calculate arcs from reference point
7 Calculate locations from reference point
8 Verify workpiece specifications
9 Lay out reference points
10 Lay out angles, arcs and locations from reference point
11 Label workpiece
12 Perform semi-precision layouts
13 Perform precision layouts from blueprints
14 Verify layouts

DUTY E: Selecting Materials

TASKS:
1 Interpret color codes, numbering systems, and classification systems of materials (ie. AISI, SAE)
2 Select material for job
3 Identify materials

DUTY F: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Dispose of scrap metal chips, shavings, trash and waste
2 Clean and maintain work area and leave in safe condition
3 Clean and store hand tools, cutters, fixtures, jigs and attachments
4 Store grinding wheels
5 Follow tool crib procedures
6 Inspect and remove, replace or adjust machine guards
7 Scrape and paint machines
8 Report problems to supervisor

9 Complete time cards
10 Complete job status reports
11 Make equipment failure reports
12 Record preventive maintenance activities
13 Record repair activities
14 Read job orders and process sheets to determine tooling and set up information
15 Determine basic maintenance procedures using manuals
16 Participate in participative management program (Quality Circles)

DUTY G: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Select most productive machine tool and tooling for job
4 Coordinate workers with work to be done
5 Write work schedules
6 Schedule and control shop flow of jobs
7 Maintain files
8 Maintain production records
9 Maintain labor records
10 Maintain warranty records
11 Review job orders, process sheets and blueprint specifications
12 Issue blueprints, job orders, process sheets and tooling
13 Explain work requirements
14 Write production and progress reports
15 Write technical reports
16 Inventory supplies and equipment
17 Maintain charts, tables, graphs or status boards on work scheduled
18 Initiate engineering change notices and rejection reports
19 Write requests for deviation to specifications
20 Check job/time cards
21 Supervise machine use
22 Inspect shop equipment and arrange for maintenance and repair work
23 Prepare preventive maintenance schedule
24 Evaluate preventive maintenance program
25 Coordinate maintenance and repair of shop equipment
26 Prepare repair schedule
27 Observe maintenance and repair activities
28 Evaluate repair activities
29 Plan and implement technical training for employees
30 Train employees to operate mechanical devices
31 Evaluate employee progress and performance
32 Follow up employee reports of problems or equipment failures

33 Interview job applicants
34 Estimate cost of equipment installation
35 Estimate cost of system installation
36 Estimate cost of repairs and downtime

DUTY H: Assembling and Disassembling Machine Mechanisms

TASKS:
1 Install belts and pulleys
2 Align and adjust tension of belt drives
3 Maintain belt drives
4 Construct belt joints
5 Inspect belt drive systems
6 Troubleshoot belt drive systems
7 Repair belt drive systems
8 Install chain and sprocket drive
9 Align and adjust tension of chain and sprocket drives
10 Maintain chain and sprocket drives
11 Inspect chain and sprocket drives
12 Troubleshoot chain and sprocket drives
13 Repair chain and sprocket drives
14 Install and align gear drives
15 Maintain gear drives
16 Clean and lubricate gear drives
17 Inspect variable speed drives
18 Troubleshoot variable speed drives
19 Repair variable speed drives
20 Inspect rack and pinion drives
21 Troubleshoot rack and pinion drives
22 Repair rack and pinion drives
23 Inspect ring and pinion drives
24 Troubleshoot ring and pinion drives
25 Repair ring and pinion drives
26 Inspect gear box drives
27 Troubleshoot gear box drives
28 Repair gear box drives
29 Install couplings
30 Align couplings
31 Inspect couplings
32 Troubleshoot couplings
33 Disassemble and reassemble couplings
34 Replace packing and seals
35 Remove and install mechanical seals
36 Align pillow blocks and bearings
37 Install pillow blocks and bearings
38 Remove and install bearings in bores
39 Remove and install sleeve bearings in bores
40 Remove and install bearings on shafts
41 Lubricate equipment
42 Inspect bearings and mechanisms
43 Troubleshoot bearings
44 Replace shaft
45 Install shaft assembly
46 Align shaft
47 Replace universal joint
48 Install universal joint

49 Repair universal joint
50 Adjust gibs for free operation
51 Inspect linkages and lever mechanisms
52 Troubleshoot linkages and lever mechanisms
53 Repair linkages and lever mechanisms
54 Install centrifugal clutch
55 Inspect centrifugal clutch
56 Repair centrifugal clutch
57 Install safety guards for conveyor system
58 Fabricate safety guards for conveyor system
59 Align drive mechanism for conveyor system
60 Assemble conveyor system from component parts
61 Install conveyor into material handling system
62 Troubleshoot conveyor system
63 Repair conveyor system

DUTY I: Installing and Removing Machinery

TASKS:
1 Prepare area for machine installation
2 Raise machinery using jacks, bars and blocks
3 Move machinery using fork lift
4 Rig chain fall to remove or install machinery
5 Move machinery using overhead crane or chainfall
6 Position and secure machinery on foundation
7 Level machinery on foundation
8 Align machinery
9 Connect machinery to electrical source
10 Connect machine to air or hydraulic source
11 Balance machinery using vibration test
12 Block and brace equipment for moving or shipping
13 Crib equipment
14 Lift equipment using slings
15 Move equipment with skids
16 Move equipment with dollies

DUTY J: Maintaining Hydraulic Systems

TASKS:
1 Shut down hydraulic system
2 Replace and clean hydraulic strainer/filters
3 Clean and flush hydraulic motor system
4 Drain and refill hydraulic system
5 Troubleshoot hydraulic actuator
6 Replace hydraulic actuator
7 Adjust hydraulic pressure
8 Troubleshoot pressure regulators
9 Troubleshoot hydraulic control valve operations
10 Inspect pressure control valve
11 Replace valve in hydraulic system
12 Null hydraulic servo valve
13 Test accumulator charge
14 Recharge accumulator
15 Replace defective accumulator
16 Replace hydraulic pump
17 Align hydraulic pump

18 Seal gaskets
19 Replace hydraulic motor
20 Align hydraulic motor
21 Replace internal components in hydraulic motor
22 Replace hydraulic gasket and seals
23 Install hydraulic line
24 Connect hydraulic components to machines
25 Replace damaged hydraulic lines, fittings, and components
26 Clear restriction from sealed hydraulic system
27 Troubleshoot heat exchanger
28 Measure pressure within hydraulic system
29 Measure flow within hydraulic system
30 Inspect hydraulic systems
31 Troubleshoot hydraulic systems
32 Repair hydraulic systems
33 Maintain hydraulic systems
34 Determine problem using available troubleshooting techniques
35 Interpret control diagrams for hydraulic systems
36 Diagnose malfunctions of hydraulic systems using test and measurement equipment

DUTY K: Maintaining Pneumatic Systems

TASKS:
1 Troubleshoot air pressure regulators
2 Troubleshoot pneumatic pump
3 Verify pneumatic flow control valve operation
4 Troubleshoot pneumatic actuator
5 Replace defective pneumatic gages
6 Replace defective pneumatic lines
7 Replace air filter
8 Service pneumatic air compressor
9 Replace pneumatic air compressor
10 Verify air motor
11 Replace air motor
12 Sequence pneumatic cylinders
13 Replace pneumatic cylinders
14 Verify humidity control
15 Troubleshoot air logic system
16 Verify air logic to diagram
17 Leak test vacuum/pressure system
18 Clear restrictions from sealed pneumatic system
19 Test fittings for air leaks
20 Repair air leaks
21 Replace defective fittings
22 Lubricate pneumatic system
23 Install pneumatic systems
24 Inspect pneumatic systems
25 Troubleshoot pneumatic systems
26 Repair pneumatic systems
27 Maintain pneumatic systems
28 Determine problem using available troubleshooting techniques

29 Interpret control diagrams for pneumatic systems
30 Diagnose malfunctions of pneumatic systems using test and measurement equipment

DUTY L: Maintaining and Repairing Electrical Systems

TASKS:
1 Replace fuses
2 Reset circuit breaker after overload
3 Remove electrical overloads
4 Troubleshoot electrical control components
5 Change rotation of 3-phase electric motor
6 Replace faulty electrical cords and plugs
7 Replace electric motor brushes
8 Lubricate electric motor
9 Install or replace electric motor
10 Clean electric motor
11 Replace defective relay
12 Verify electrical sensor operation
13 Verify motor starter circuit
14 Verify electric motor operation
15 Verify thermostat operation
16 Verify power supply operation
17 Verify solenoid operation
18 Determine electrical problems using available troubleshooting techniques
19 Interpret control diagrams for electrical systems
20 Diagnose malfunctions of electrical systems using test and measurement equipment

DUTY M: Maintaining and Repairing Heating and Cooling Devices

TASKS:
1 Calibrate and adjust thermostat
2 Lubricate air compressor
3 Adjust air compressor to minimize noise
4 Adjust air compressor to reduce overload
5 Disassemble and reassemble air compressor
6 Install air compressor
7 Clean condenser/evaporator
8 Install air cooled condenser
9 Install evaporative condenser
10 Calibrate metering devices
11 Clean air circulation ducts
12 Install fan guards, shrouds or mesh covers
13 Install mechanical roof ventilators
14 Remove foreign debris from cooling towers
15 Drain and charge air conditioning system
16 Clean and lubricate fans and ventilators
17 Calibrate and adjust airflow controls
18 Calibrate and adjust temperature controls
19 Calibrate and adjust pneumatic controls
20 Calibrate and adjust pressure controls
21 Replace air filters and air bags
22 Assemble and disassemble centrifugal fan
23 Inspect freight and personnel elevators

24 Adjust doors, guards and gates for elevators
25 Replace elevator cables
26 Replace hand controls for elevators

DUTY N: Inspecting and Repairing Cranes and Elevators

TASKS:
1 Replace cable on electric cable drum hoist
2 Replace cable on bridge crane
3 Replace pulleys on cranes
4 Replace mechanical safety devices on cranes
5 Replace electrical safety devices on cranes
6 Inspect tracks and runway areas
7 Replace runway tracks for cranes
8 Adjust mechanical brakes on cranes and elevators
9 Troubleshoot and repair cranes
10 Troubleshoot and repair elevators

DUTY O: Maintaining and Repairing Electronic Control Systems

TASKS:
1 Verify servo amplifier operation
2 Verify servo motor control circuits
3 Verify terminal device operation
4 Troubleshoot communications links
5 Troubleshoot printed circuit board
6 Calibrate position feedback device
7 Troubleshoot position device
8 Perform electrical adjustments on servo power amplifiers

DUTY P: Performing Communication Functions

TASKS:
1 Prepare technical reports including charts, graphs, status reports, project summary, and manuals
2 Make oral presentations
3 Demonstrate how equipment works

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.

AUTOMATED MANUFACTURING SYSTEMS TECHNICIAN

DUTY A: Applying Safety Practices

TASKS:
1 Comply with shop and equipment safety rules
2 Apply basic emergency first aid techniques
3 Complete accident report
4 Inspect work area and equipment for safe working environment
5 Report shop, environmental and equipment safety violations
6 Demonstrate use of fire extinguishers
7 Participate in disaster control exercises
8 Participate in shop safety committee
9 Correct safety hazards
10 Demonstrate cardiopulmonary resuscitation (CPR) techniques
11 Comply with safety requirements for working around automated systems
12 Participate in safety training program
13 Conduct safety training program

DUTY B: Performing Benchwork Operations

TASKS:
1 Cut threads with taps and dies
2 Remove threaded fasteners and repair threads
3 Deburr parts
4 Polish parts using coated abrasives
5 Sharpen and polish tools using abrasive stones
6 Rough finish parts with hand filing machines
7 Rough grind parts with hand grinders
8 Finish parts with hand grinders
9 Determine high spots using pigment
10 Remove high spots
11 Polish and buff parts with portable hand tools
12 Lap and fit parts
13 Scrape friction surfaces
14 Disassemble, assemble and straighten parts using arbor press
15 Cut keyway with broach
16 Disassemble, fit and reassemble parts
17 Lift and position workpiece using hoists
18 Work materials with hand tools
19 Work materials with portable power tools

DUTY C: Performing Precision Measurement

TASKS:
1 Measure parts with semi-precision measuring tools
2 Inspect parts with precision measuring tools
3 Inspect parts with comparison measuring tools
4 Set up and inspect parts using dial indicators
5 Measure threads
6 Measure tapers

7 Inspect keyways
8 Measure gears
9 Inspect surface finish of parts
10 Calibrate precision measuring tools
11 Clean and store precision measuring tools
12 Verify dimensions
13 Verify alignments
14 Verify clearances
15 Inspect machined parts
16 Inspect assemblies
17 Inspect parts with metric measuring instruments

DUTY D: Performing Layouts

TASKS:
1 Analyze specifications
2 Compute layout dimensions
3 Plan layout operations
4 Calculate reference points
5 Calculate angles from reference point
6 Calculate arcs from reference point
7 Calculate locations from reference point
8 Verify workpiece specifications
9 Lay out reference points
10 Lay out angles, arcs and locations from reference point
11 Label workpiece
12 Perform semi-precision layouts
13 Perform precision layouts from blueprints
14 Verify layouts

DUTY E: Selecting Materials

TASKS:
1 Interpret color codes, numbering systems, and classification systems of materials (ie. AISI, SAE)
2 Select material for job
3 Identify metals using spark test
4 Identify metals using variety of tests
5 Identify materials

DUTY F: Performing Housekeeping and Recordkeeping Activities

TASKS:
1 Clean and maintain work area and leave in safe condition
2 Clean and store hand tools, cutters, fixtures, jigs and attachments
3 Follow tool crib procedures
4 Report problems to supervisor
5 Complete time cards
6 Complete job status reports
7 Make equipment failure reports
8 Record preventive maintenance activities

9 Record repair activities
10 Read job orders and process sheets to determine tooling and set up information
11 Determine basic maintenance procedures using manuals
12 Participate in participative management program (Quality Circles)

DUTY G: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Requisition, schedule and distribute supplies and materials
3 Select most productive machine tool and tooling for job
4 Coordinate workers with work to be done
5 Write work schedules
6 Schedule and control shop flow of jobs
7 Maintain files
8 Maintain production records
9 Maintain labor records
10 Maintain warranty records
11 Review job orders, process sheets and blueprint specifications
12 Issue blueprints, job orders, process sheets and tooling
13 Explain work requirements
14 Write production and progress reports
15 Write technical reports
16 Inventory supplies and equipment
17 Maintain charts, tables, graphs or status boards on work scheduled
18 Submit parts for first piece inspection
19 Conduct in-process inspections
20 Monitor reports of discrepancy or rejects during production process
21 Follow up on end product quality control standards
22 Initiate engineering change notices and rejection reports
23 Write requests for deviation to specifications
24 Check job/time cards
25 Supervise machine use
26 Inspect shop equipment and arrange for maintenance and repair work
27 Prepare preventive maintenance schedule
28 Evaluate preventive maintenance program
29 Coordinate maintenance and repair of shop equipment
30 Prepare repair schedule
31 Observe maintenance and repair activities
32 Evaluate repair activities
33 Plan and implement technical training for employees
34 Train employees to operate mechanical devices
35 Evaluate employee progress and performance

36 Follow up employee reports of problems or equipment failures
37 Interview job applicants
38 Conduct meetings
39 Estimate cost of equipment installation
40 Estimate cost of system installation
41 Estimate cost of repairs and downtime
42 Supervise assembly operations

DUTY H: Assembling and Disassembling Machine Mechanisms

TASKS:
1 Install belts and pulleys
2 Align and adjust tension of belt drives
3 Maintain belt drives
4 Construct belt joints
5 Inspect belt drive systems
6 Troubleshoot belt drive systems
7 Repair belt drive systems
8 Install chain and sprocket drive
9 Align and adjust tension of chain and sprocket drives
10 Maintain chain and sprocket drives
11 Inspect chain and sprocket drives
12 Troubleshoot chain and sprocket drives
13 Repair chain and sprocket drives
14 Install and align gear drives
15 Maintain gear drives
16 Clean and lubricate gear drives
17 Inspect variable speed drives
18 Troubleshoot variable speed drives
19 Repair variable speed drives
20 Inspect rack and pinion drives
21 Troubleshoot rack and pinion drives
22 Repair rack and pinion drives
23 Inspect ring and pinion drives
24 Troubleshoot ring and pinion drives
25 Repair ring and pinion drives
26 Inspect gear box drives
27 Troubleshoot gear box drives
28 Repair gear box drives
29 Install couplings
30 Align couplings
31 Inspect couplings
32 Troubleshoot couplings
33 Disassemble and reassemble couplings
34 Replace packing and seals
35 Remove and install mechanical seals
36 Align pillow blocks and bearings
37 Install pillow blocks and bearings
38 Remove and install bearings in bores
39 Remove and install sleeve bearings in bores
40 Remove and install bearings on shafts
41 Lubricate equipment
42 Inspect bearings and mechanisms
43 Troubleshoot bearings
44 Replace shaft

45 Install shaft assembly
46 Align shaft
47 Replace universal joint
48 Install universal joint
49 Repair universal joint
50 Adjust gibs for free operation
51 Inspect linkages and lever mechanisms
52 Troubleshoot linkages and lever mechanisms
53 Repair linkages and lever mechanisms
54 Install centrifugal clutch
55 Inspect centrifugal clutch
56 Repair centrifugal clutch
57 Install safety guards for conveyor system
58 Fabricate safety guards for conveyor system
59 Align drive mechanism for conveyor system
60 Assemble conveyor system from component parts
61 Install conveyor into material handling system
62 Troubleshoot conveyor system
63 Repair conveyor system

DUTY I: Installing and Removing Machinery

TASKS:
1 Prepare area for machine installation
2 Raise machinery using jacks, bars and blocks
3 Move machinery using fork lift
4 Rig chain fall to remove or install machinery
5 Move machinery using overhead crane or chainfall
6 Position and secure machinery on foundation
7 Level machinery on foundation
8 Align machinery
9 Connect machinery to electrical source
10 Connect machine to air or hydraulic source
11 Balance machinery using vibration test
12 Block and brace equipment for moving or shipping
13 Crib equipment
14 Lift equipment using slings
15 Move equipment with skids
16 Move equipment with dollies

DUTY J: Maintaining Hydraulic Systems

TASKS:
1 Shut down hydraulic system
2 Replace and clean hydraulic strainer/filters
3 Clean and flush hydraulic motor system
4 Drain and refill hydraulic system
5 Troubleshoot hydraulic actuator
6 Replace hydraulic actuator
7 Adjust hydraulic pressure
8 Troubleshoot pressure regulators
9 Troubleshoot hydraulic control valve operations
10 Inspect pressure control valve
11 Replace valve in hydraulic system
12 Null hydraulic servo valve
13 Test accumulator charge

14 Recharge accumulator
15 Replace defective accumulator
16 Replace hydraulic pump
17 Align hydraulic pump
18 Seal gaskets
19 Replace hydraulic motor
20 Align hydraulic motor
21 Replace internal components in hydraulic motor
22 Replace hydraulic gasket and seals
23 Install hydraulic line
24 Connect hydraulic components to machines
25 Replace damaged hydraulic lines, fittings, and components
26 Clear restriction from sealed hydraulic system
27 Troubleshoot heat exchanger
28 Measure pressure within hydraulic system
29 Measure flow within hydraulic system
30 Inspect hydraulic systems
31 Troubleshoot hydraulic systems
32 Repair hydraulic systems
33 Maintain hydraulic systems
34 Determine problem using available troubleshooting techniques
35 Interpret control diagrams for hydraulic systems
36 Diagnose malfunctions of hydraulic systems using test and measurement equipment

DUTY K: Maintaining Pneumatic Systems

TASKS:
1 Troubleshoot air pressure regulators
2 Troubleshoot pneumatic pump
3 Verify pneumatic flow control valve operation
4 Troubleshoot pneumatic actuator
5 Replace defective pneumatic gages
6 Replace defective pneumatic lines
7 Replace air filter
8 Service pneumatic air compressor
9 Replace pneumatic air compressor
10 Verify air motor
11 Replace air motor
12 Sequence pneumatic cylinders
13 Replace pneumatic cylinders
14 Verify humidity control
15 Troubleshoot air logic system
16 Verify air logic to diagram
17 Leak test vacuum/pressure system
18 Clear restrictions from sealed pneumatic system
19 Test fittings for air leaks
20 Repair air leaks
21 Replace defective fittings
22 Lubricate pneumatic system
23 Install pneumatic systems
24 Inspect pneumatic systems
25 Troubleshoot pneumatic systems
26 Repair pneumatic systems

27 Maintain pneumatic systems
28 Determine problem using available troubleshooting techniques
29 Interpret control diagrams for pneumatic systems
30 Diagnose malfunctions of pneumatic systems using test and measurement equipment

DUTY L: Maintaining and Repairing Electrical Systems

TASKS:
1 Replace fuses
2 Reset circuit breaker after overload
3 Remove electrical overloads
4 Troubleshoot electrical control components
5 Change rotation of 3-phase electric motor
6 Replace faulty electrical cords and plugs
7 Replace electric motor brushes
8 Lubricate electric motor
9 Ins[illegible] or replace electric motor
10 Clean electric motor
11 Replace defective relay
12 Verify electrical sensor operation
13 Verify motor starter circuit
14 Verify electric motor operation
15 Verify thermostat operation
16 Verify power supply operation
17 Verify solenoid operation
18 Determine electrical problems using available troubleshooting techniques
19 Interpret control diagrams for electrical systems
20 Diagnose malfunctions of electrical systems using test and measureme... equipment

DUTY M: Maintaining and Repairing Electronic Control Systems

TASKS:
1 Verify servo amplifier operation
2 Insure that environmental conditions are met
3 Verify servo motor control circuits
4 Verify terminal device operation
5 Troubleshoot communications links
6 Troubleshoot printed circuit board
7 Calibrate position feedback device
8 Troubleshoot position device
9 Troubleshoot robot controller
10 Perform electrical adjustments on servo power amplifiers
11 Determine problem using available troubleshooting techniques
12 Interpret control diagrams for electronic systems
13 Diagnose malfunctions of electronic systems using test and measurement equipment
14 Interchange different open-loop controllers between systems

15 Interchange different closed-loop controllers between systems
16 Adjust control system feedback loops

DUTY N: Maintaining and Repairing Automated Systems

TASKS:
1 Run diagnostic routine
2 Troubleshoot end effectors
3 Troubleshoot automatic lubrication system
4 Troubleshoot vision system
5 Verify pressure control system operation
6 Troubleshoot pressure or vacuum switch operation
7 Verify drive mechanism
8 Troubleshoot timing of automated (CAM) system
9 Service bearings
10 Adjust clutch/brake system
11 Adjust linkage
12 Troubleshoot overload protection device operation
13 Apply requirements of service bulletins
14 Aid fault isolation using manual's troubleshooting charts
15 Aid fault repair using manual's troubleshooting charts
16 Disassemble, repair, test, and return to service robots which have failed
17 Troubleshoot and repair automated systems
18 Maintain automated systems

DUTY O: Installing and Troubleshooting Sensors

TASKS:
1 Install and adjust tactile sensors
2 Troubleshoot and repair tactile sensors
3 Install and adjust video sensors
4 Troubleshoot and repair video sensors
5 Install and adjust fiber-optic components
6 Troubleshoot and repair fiber-optic components
7 Troubleshoot and repair fiber-optic systems
8 Set up machine vision system
9 Install and adjust magnetic sensors
10 Troubleshoot and repair magnetic sensors
11 Install and adjust thermal sensors
12 Troubleshoot and repair thermal sensors
13 Install and adjust sonic sensors
14 Troubleshoot and repair sonic sensors
15 Install and adjust pressure sensors
16 Troubleshoot and repair pressure sensors
17 Install and adjust microwave sensors
18 Troubleshoot and repair microwave sensors

DUTY P: Installing Automated Systems

TASKS:
1 Install robots
2 Install work cell

3 Install automated systems
4 Evaluate initial start-up of robotic system
5 Evaluate initial start-up of work cell
6 Evaluate initial start-up of automated system
7 Start up and debug robot system
8 Measure robot performance for distance
9 Measure robot performance for positioning
10 Measure robot performance for accuracy
11 Measure robot performance for repeatability
12 Analyze operating difficulties of robots and adjust to specifications
13 Adjust equipment for accuracy and repeatability
14 Install and adjust end of arm tools (end effectors)
15 Install and adjust actuators (open/closed loop)
16 Verify system interlock operation
17 Install robot controller
18 Install programmable controller and its input/output devices
19 Install communication links
20 Optimize existing system performance
21 Field test robot to assure conformance to specifications
22 Define axis control & feedback specifications
23 Specify robot coordinate system
24 Define human interface with automated system
25 Interconnect robots & other equipment
26 Analyze & select sensing requirements for manufacturing requirements
27 Set up robot to pick and place
28 Design system for counting regularly shaped objects
29 Design system for counting irregularly shaped objects
30 Coordinate operation of several pieces of automatic equipment
31 Adjust automated systems for accuracy and repeatability
32 Start up and shut down automated production system
33 Follow manufacturer's troubleshooting procedures for automated system

DUTY Q: Programming Automated Systems

TASKS:
1 Develop written program
2 Enter executive software into control unit
3 Load program into robot
4 Test program
5 Operate teach mode
6 Interpret error messages
7 Program stepper motors
8 Program programmable logic controllers (PLC's) for specific sequence of events in performing application
9 Draw logic diagrams (flow charts)
10 Program, test, & edit using teaching pendant
11 Perform zeroing of encoders

DUTY R: Programming and Planning

TASKS:
1 Develop programmed instructions from blueprint
2 Develop programmed instructions from piece part
3 Draw sketch of desired workpiece
4 Select program, (manual or computer-assisted)
5 Choose machine tools for part
6 Select tools and holders
7 Select spindle speed
8 Select feedrate for axis travel
9 Position workpiece in relation to machine axis
10 Determine absolute or incremental mode
11 Compute polar/rectangular coordinates
12 Compute workpiece geometry
13 Verify cutter path
14 Plot program
15 Depict part graphically
16 Define cutter path
17 Operate post processor
18 Write post processor
19 Program tool change procedure
20 Prepare operator instructions for piece part
21 Calculate run time
22 Prepare tape
23 Select canned cycles
24 Program restart points
25 Write manual program
26 Program with purchased software
27 Design special fixtures for custom job
28 Design clamps & holders for custom job
29 Write manual complex contouring program
30 Enter tool offset
31 Enter tool length compensation
32 Repair broken tape
33 Update programs from engineering changes
34 Determine job priorities
35 Schedule programs
36 Schedule heat-treated materials
37 Schedule secondary processes
38 Schedule plating

DUTY S: Performing Operating Functions of Automated System

TASKS:
1 Assist supervisor in implementing plan for initial setup installation, and maintenance of automated system
2 Determine resources needed to continue production
3 Arrange for acquisition of equipment and materials
4 Coordinate with other workers to complete task

DUTY T: Performing Communication Functions

TASKS:
1 Prepare technical reports including charts, graphs, status reports, project summary, and manuals
2 Make oral presentations
3 Interface with vendors
4 Demonstrate how equipment works
5 Train others in use of automated system's equipment

DUTY U: Performing Quality Control and Quality Assurance Functions

TASKS:
1 Co-develop and implement quality control and inspection standards and procedures
2 Conduct quality tests on process and product
3 Calibrate test and measurement equipment
4 Participate in work teams
5 Apply statistical in-process quality control (SPC)

DUTY V: Adapting Automated Systems for Manufacturing

TASKS:
1 Adapt automated system for welding applications
2 Adapt automated system for painting applications
3 Adapt automated system for bonding applications
4 Adapt automated system for machining applications
5 Adapt automated system for material handling applications
6 Adapt automated system for assembly applications
7 Adapt automated system for packing applications

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Education For Employment Task Lists

Illinois State Board of Education

Adult Vocational and Technical Education

INDUSTRIAL OCCUPATIONS

Bus Driver

*Employability Skills

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EMPLOYABILITY SKILLS

DUTY A: Identifying Employment Opportunities

SKILLS:
1 Identify requirements for job
2 Investigate educational opportunities
3 Investigate occupational opportunities
4 Locate resources for finding employment
5 Confer with prospective employers
6 Identify job trends

DUTY B: Applying Employment Seeking Skills

SKILLS:
1 Locate job openings
2 Document skills and abilities (resume)
3 Prepare for interview
4 Participate in interview
5 Complete required tests
6 Complete required forms
7 Write application letter
8 Write follow-up letter
9 Write acceptance letter
10 Evaluate job offer
11 Evaluate job rejection

DUTY C: Interpreting Employment Capabilities

SKILLS:
1 Match interest to job area
2 Match aptitudes to job area
3 Verify abilities
4 Identify immediate work goal
5 Develop career plan

DUTY D: Demonstrating Appropriate Work Behavior

SKILLS:
1 Exhibit dependability
2 Demonstrate punctuality
3 Follow rules and regulations
4 Recognize the consequences of dishonesty
5 Complete assignments in accurate and timely manner
6 Control emotions
7 Assume responsibility for own decisions and actions
8 Exhibit pride and loyalty
9 Exhibit ability to handle pressures and tensions
10 Demonstrate ability to set priorities
11 Demonstrate problem-solving skills

DUTY E: Maintaining Safe and Healthy Environment

SKILLS:
1 Comply with safety and health rules
2 Select correct tools and equipment
3 Utilize equipment correctly

4 Use appropriate action during emergencies
5 Maintain clean and orderly work area
6 Demonstrate personal hygiene and cleanliness

DUTY F: Maintaining Business-Like Image

SKILLS: 1 Participate in company or agency orientation
2 Demonstrate knowledge of company or agency products and services
3 Exhibit positive behavior
4 Read current job-related publications
5 Support and promote employer's company image and purpose
6 Maintain appearance to comply with company standards

DUTY G: Maintaining Working Relationships with Others

SKILLS: 1 Work productively with others
2 Show empathy, respect and support for others
3 Demonstrate procedures and assist others when necessary
4 Recognize, analyze and solve or refer problems
5 Minimize occurrence of problems
6 Channel emotional reaction constructively

DUTY H: Communicating on the Job

SKILLS: 1 Read and comprehend written communications and information
2 Use correct grammar
3 Speak effectively with others
4 Use job-related terminology
5 Listen attentively
6 Write legibly
7 Use telephone etiquette
8 Follow written and oral directions
9 Ask questions
10 Locate information in order to accomplish task
11 Prepare written communication
12 Utilize keyboarding skills
13 Utilize computer skills

DUTY I: Adapting to Change

SKILLS: 1 Recognize need to change
2 Demonstrate willingness to learn
3 Demonstrate flexibility
4 Participate in continuing education
5 Seek work challenges
6 Adjust career goals/plan as needed

DUTY J: Understanding How a Business Works

SKILLS:
1 Recognize the role of business in the enterprise system
2 Identify general responsibilities of employees
3 Identify general responsibilities of management/employers
4 Investigate opportunities and options for business ownership
5 Identify planning processes needed to open a business
6 Participate in meetings

DUTY K: Performing Mathematical Skills

SKILLS:
1 Apply mathematics for problem solving
2 Add and subtract whole numbers, decimals and fractions
3 Multiply and divide whole numbers, decimals and fractions
4 Convert numbers between forms expressed as fractions, decimals and percents
5 Convert between standard American units of measure
6 Convert between standard American units and metric units

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BUS DRIVER

DUTY A: Performing Pre-Trip Inspection

TASKS:
1 Inspect exterior of unit for general appearance and condition
2 Inspect interior of unit for general appearance and condition
3 Check safety equipment
4 Secure cargo
5 Conduct performance inspection within first twenty-five miles

DUTY B: Performing Pre-Trip Recordkeeping

TASKS:
1 Sign prepared condition report
2 Check for accident reports packet
3 Check route

DUTY C: Backing and Parking

TASKS:
1 Back unit using mirrors
2 Park unit
3 Secure unit when parked
4 Enter traffic from parked position

DUTY D: Slowing and Stopping

TASKS:
1 Slow unit using brakes
2 Slow unit by gearing down
3 Stop unit
4 Apply cool down and shut off procedures

DUTY E: Operating in Traffic, Passing and Turning

TASKS:
1 Drive unit through turns
2 Drive unit through intersections
3 Drive unit across railroad grades
4 Drive unit on open highway
5 Pass other vehicles on two-lane highway
6 Pass other vehicles on four (or more) lane highway

DUTY F: Placing Vehicle in Motion and Using Controls

TASKS:
1 Start and warm up engine
2 Check instruments at regular intervals
3 Maintain proper engine revolutions per minute while driving
4 Test service brake
5 Build full pressure in air tanks before starting

DUTY G: Keeping Records for Pickup and Delivery

TASKS:
1 Fill out logbooks as prescribed by Federal regulations
2 Notify dispatch immediately in event of an emergency
3 Report delays to company
4 Complete accident reports
5 Follow company postaccident reporting procedures
6 Complete daily vehicle condition report
7 Fill out detention report
8 Follow inspection station procedures

DUTY H: Performing Emergency Procedures

TASKS:
1 Change tires
2 Make emergency repairs to electrical system
3 Make emergency repairs to damaged water lines
4 Respond to emergency involving personal injury
5 Respond to emergency involving vehicle damage
6 Perform first aid on burns
7 Perform first aid for shock
8 Perform first aid for external bleeding
9 Apply liability and Good Samaritan laws regarding emergency first aid
10 Operate citizens band (CB) radio equipment
11 Prepare vehicle and roadway for disabled vehicle

DUTY I: Complying with Licensing Regulations

TASKS:
1 Read and interpret U.S. Department of Transportation regulations
2 Read and interpret State Department of Transportation regulations
3 Take and pass U.S. Department of Transportation Motor Carrier Regulations written test
4 Take and pass U.S. Department of Transportation Motor Carrier Regulations road test
5 Take and pass State Department of Transportation driver's written test
6 Take and pass State Department of Transportation driver's road test
7 Attend necessary licensing seminars
8 Obtain and maintain necessary driving permits

DUTY J: Performing Bus Driving Skills

TASKS:
1 Load baggage
2 Unload baggage
3 Assist passengers with baggage
4 Record cash receipts
5 Collect tickets and fares
6 Regulate coach environment for passenger comfort
7 Report delays to passengers

8 Transport passengers over specified route according to time schedule
9 Admonish individuals to be seated and orderly while en route

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Education For Employment Task Lists

Illinois State Board of Education

Adult Vocational and Technical Education

INDUSTRIAL OCCUPATIONS

Truck Driver

*Employability Skills

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DUTY A: Identifying Employment Opportunities

SKILLS:
1 Identify requirements for job
2 Investigate educational opportunities
3 Investigate occupational opportunities
4 Locate resources for finding employment
5 Confer with prospective employers
6 Identify job trends

DUTY B: Applying Employment Seeking Skills

SKILLS:
1 Locate job openings
2 Document skills and abilities (resume)
3 Prepare for interview
4 Participate in interview
5 Complete required tests
6 Complete required forms
7 Write application letter
8 Write follow-up letter
9 Write acceptance letter
10 Evaluate job offer
11 Evaluate job rejection

DUTY C: Interpreting Employment Capabilities

SKILLS:
1 Match interest to job area
2 Match aptitudes to job area
3 Verify abilities
4 Identify immediate work goal
5 Develop career plan

DUTY D: Demonstrating Appropriate Work Behavior

SKILLS:
1 Exhibit dependability
2 Demonstrate punctuality
3 Follow rules and regulations
4 Recognize the consequences of dishonesty
5 Complete assignments in accurate and timely manner
6 Control emotions
7 Assume responsibility for own decisions and actions
8 Exhibit pride and loyalty
9 Exhibit ability to handle pressures and tensions
10 Demonstrate ability to set priorities
11 Demonstrate problem-solving skills

DUTY E: Maintaining Safe and Healthy Environment

SKILLS:
1 Comply with safety and health rules
2 Select correct tools and equipment
3 Utilize equipment correctly

4 Use appropriate action during emergencies
5 Maintain clean and orderly work area
6 Demonstrate personal hygiene and cleanliness

DUTY F: Maintaining Business-Like Image

SKILLS: 1 Participate in company or agency orientation
2 Demonstrate knowledge of company or agency products and services
3 Exhibit positive behavior
4 Read current job-related publications
5 Support and promote employer's company image and purpose
6 Maintain appearance to comply with company standards

DUTY G: Maintaining Working Relationships with Others

SKILLS: 1 Work productively with others
2 Show empathy, respect and support for others
3 Demonstrate procedures and assist others when necessary
4 Recognize, analyze and solve or refer problems
5 Minimize occurrence of problems
6 Channel emotional reaction constructively

DUTY H: Communicating on the Job

SKILLS: 1 Read and comprehend written communications and information
2 Use correct grammar
3 Speak effectively with others
4 Use job-related terminology
5 Listen attentively
6 Write legibly
7 Use telephone etiquette
8 Follow written and oral directions
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10 Locate information in order to accomplish task
11 Prepare written communication
12 Utilize keyboarding skills
13 Utilize computer skills

DUTY I: Adapting to Change

SKILLS: 1 Recognize need to change
2 Demonstrate willingness to learn
3 Demonstrate flexibility
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6 Adjust career goals/plan as needed

DUTY J: Understanding How a Business Works

SKILLS:
1 Recognize the role of business in the enterprise system
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3 Identify general responsibilities of management/employers
4 Investigate opportunities and options for business ownership
5 Identify planning processes needed to open a business
6 Participate in meetings

DUTY K: Performing Mathematical Skills

SKILLS:
1 Apply mathematics for problem solving
2 Add and subtract whole numbers, decimals and fractions
3 Multiply and divide whole numbers, decimals and fractions
4 Convert numbers between forms expressed as fractions, decimals and percents
5 Convert between standard American units of measure
6 Convert between standard American units and metric units

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TRUCK DRIVER

DUTY A: Performing Pre-Trip Inspection

TASKS:
1 Inspect exterior of unit for general appearance and condition
2 Inspect interior of unit for general appearance and condition
3 Check safety equipment
4 Secure cargo
5 Check specialized cargo handling equipment
6 Conduct performance inspection before leaving terminal

DUTY B: Performing Pre-Trip Recordkeeping

TASKS:
1 Check and secure tractor trailer or vehicle permit
2 Sign prepared condition report
3 Check freight bills
4 Check for accident reports packet
5 Check route
6 Check hazardous materials placards
7 Complete hazardous materials loading chart
8 Obtain gross-ton weight

DUTY C: Coupling and Uncoupling Trailers

TASKS:
1 Align tractor to trailer before backing
2 Connect gladhands to trailer brakes before coupling
3 Connect gladhands and light line
4 Couple tractor to trailer
5 Raise and lower landing gear fully
6 Check visually kingpin assembly for proper coupling
7 Check coupling and try to pull away from trailer
8 Check that surface will support trailer before uncoupling

DUTY D: Backing and Parking

TASKS:
1 Back unit using mirrors
2 Park unit
3 Secure unit when parked
4 Enter traffic from parked position

DUTY E: Slowing and Stopping

TASKS:
1 Slow unit using brakes
2 Slow unit by gearing down
3 Stop unit
4 Apply cool down and shut off procedures

DUTY F: Operating in Traffic, Passing and Turning

TASKS:
1 Drive unit through turns
2 Drive unit through intersections

3 Drive unit across railroad grades
4 Drive unit on open highway
5 Pass other vehicles on two-lane highway
6 Pass other vehicles on four (or more) lane highway

DUTY G: Placing Vehicle in Motion and Using Controls

TASKS:
1 Start and warm up engine
2 Check instruments at regular intervals
3 Maintain proper engine revolutions per minute while driving
4 Check tractor-protection valve
5 Test service brake
6 Build full pressure in air tanks before starting

DUTY H: Keeping Records for Pickup and Delivery

TASKS:
1 Fill out logbooks as prescribed by Federal regulations
2 Notify dispatch immediately in event of emergency
3 Report delays to company
4 Complete accident reports
5 Follow company postaccident reporting procedures
6 Complete daily vehicle condition report
7 Fill out detention report
8 Place hazardous materials shipping papers on driver's seat when vehicle is unattended
9 Note damaged merchandise exceptions on shipping document dispatch
10 Inspect cargo condition prior to delivery
11 Handle cash on delivery (C.O.D.) shipments
12 Verify door seal number against shipping document
13 Fill out trip lease reports
14 Follow Port of Entry and Exit procedures
15 Follow inspection station procedures

DUTY I: Performing Emergency Procedures

TASKS:
1 Change tires
2 Make emergency repairs to electrical system
3 Make emergency repairs to damaged water lines
4 Service refrigerator unit to insure air, fuel, oil and water
5 Respond to emergency involving personal injury
6 Respond to emergency involving vehicle damage
7 Respond to emergency involving other damage
8 Perform first aid on burns
9 Perform first aid for shock
10 Perform first aid for external bleeding
11 Apply liability and Good Samaritan laws regarding emergency first aid
12 Operate citizens band (CB) radio equipment

DUTY J: Complying With Licensing Regulations

TASKS:
1 Read and interpret U.S. Department of Transportation regulations
2 Read and interpret State Department of Transportation regulations
3 Take and pass U.S. Department of Transportation Motor Carrier Safety Regulations written test
4 Take and pass U.S. Department of Transportation Motor Carrier Safety Regulations road test
5 Take and pass State Department of Transportation driver's written test
6 Take and pass State Department of Transportation driver's road test
7 Attend necessary licensing seminars
8 Obtain and maintain necessary driving permits

DUTY K: Transferring Cargo

TASKS:
1 Load cargo
2 Unload cargo

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Education For Employment Task Lists

Illinois State Board of Education

Adult Vocational and Technical Education

INDUSTRIAL OCCUPATIONS

Auto Body Repairer

*Employability Skills

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EMPLOYABILITY SKILLS

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SKILLS:
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2 Investigate educational opportunities
3 Investigate occupational opportunities
4 Locate resources for finding employment
5 Confer with prospective employers
6 Identify job trends

DUTY B: Applying Employment Seeking Skills

SKILLS:
1 Locate job openings
2 Document skills and abilities (resume)
3 Prepare for interview
4 Participate in interview
5 Complete required tests
6 Complete required forms
7 Write application letter
8 Write follow-up letter
9 Write acceptance letter
10 Evaluate job offer
11 Evaluate job rejection

DUTY C: Interpreting Employment Capabilities

SKILLS:
1 Match interest to job area
2 Match aptitudes to job area
3 Verify abilities
4 Identify immediate work goal
5 Develop career plan

DUTY D: Demonstrating Appropriate Work Behavior

SKILLS:
1 Exhibit dependability
2 Demonstrate punctuality
3 Follow rules and regulations
4 Recognize the consequences of dishonesty
5 Complete assignments in accurate and timely manner
6 Control emotions
7 Assume responsibility for own decisions and actions
8 Exhibit pride and loyalty
9 Exhibit ability to handle pressures and tensions
10 Demonstrate ability to set priorities
11 Demonstrate problem-solving skills

DUTY E: Maintaining Safe and Healthy Environment

SKILLS:
1 Comply with safety and health rules
2 Select correct tools and equipment
3 Utilize equipment correctly

4 Use appropriate action during emergencies
5 Maintain clean and orderly work area
6 Demonstrate personal hygiene and cleanliness

DUTY F: Maintaining Business-Like Image

SKILLS: 1 Participate in company or agency orientation
2 Demonstrate knowledge of company or agency products and services
3 Exhibit positive behavior
4 Read current job-related publications
5 Support and promote employer's company image and purpose
6 Maintain appearance to comply with company standards

DUTY G: Maintaining Working Relationships with Others

SKILLS: 1 Work productively with others
2 Show empathy, respect and support for others
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DUTY H: Communicating on the Job

SKILLS: 1 Read and comprehend written communications and information
2 Use correct grammar
3 Speak effectively with others
4 Use job-related terminology
5 Listen attentively
6 Write legibly
7 Use telephone etiquette
8 Follow written and oral directions
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10 Locate information in order to accomplish task
11 Prepare written communication
12 Utilize keyboarding skills
13 Utilize computer skills

DUTY I: Adapting to Change

SKILLS: 1 Recognize need to change
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DUTY J: Understanding How a Business Works

SKILLS:
1 Recognize the role of business in the enterprise system
2 Identify general responsibilities of employees
3 Identify general responsibilities of management/employers
4 Investigate opportunities and options for business ownership
5 Identify planning processes needed to open a business
6 Participate in meetings

DUTY K: Performing Mathematical Skills

SKILLS:
1 Apply mathematics for problem solving
2 Add and subtract whole numbers, decimals and fractions
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5 Convert between standard American units of measure
6 Convert between standard American units and metric units

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AUTO BODY REPAIRER

DUTY A: Applying Safety Practices

TASKS:
1 Apply shop and safety equipment rules
2 Apply basic emergency first aid technique
3 Demonstrate cardiopulmonary resuscitation techniques
4 Complete accident report
5 Inspect work area and equipment for safe working environment
6 Report shop, environmental and equipment safety violations
7 Correct safety hazards
8 Participate in disaster control exercises
9 Participate in shop safety committee
10 Participate in safety training program
11 Conduct safety training program
12 Apply OSHA regulations
13 Demonstrate use of fire extinguishers
14 Follow fire code regulations
15 Store flammable materials
16 Tag cars with operating deficiencies

DUTY B: Performing Housekeeping and Recordkeeping

TASKS:
1 Clean and maintain work area and leave in safe condition
2 Follow tool crib procedures
3 Report problems to supervisor
4 Complete time cards
5 Complete job status reports
6 Participate in participation management program (Quality Circles)

DUTY C: Performing Supervisory Functions

TASKS:
1 Determine availability of machines, supplies and materials
2 Coordinate workers with work to be done
3 Schedule and control shop flow of jobs
4 Maintain files
5 Explain work requirements
6 Inventory supplies and equipment
7 Follow up on end product quality control standards
8 Check job/time cards
9 Inspect shop equipment and arrange for maintenance and repair work
10 Coordinate maintenance and repair of shop equipment
11 Plan and implement technical training for employees
12 Train employees to operate mechanical devices
13 Evaluate employee progress and performance
14 Plan and implement participation management program (Quality Circles)
15 Follow up employee reports of problems or equipment failures
16 Interview job applicants
17 Hire workers
18 Dismiss employees
19 Determine work to be done by outside firm
20 Write contract for work with outside firm

DUTY D: Estimating Costs of Repairs

TASKS:
1 Estimate cost of repairs
2 Order auto body parts and supplies
3 Write service work orders for vehicle repairs
4 Write customer invoices

DUTY E: Maintaining Tools and Equipment

TASKS:
1 Perform basic maintenance on painting equipment
2 Sharpen and recondition hand tools
3 Clean paint guns

DUTY F: Repairing Body Damage

TASKS:
1 Inspect body and frame for damage
2 Measure body and frame alignment
3 Repair and align hood and deck panels
4 Repair and align fenders
5 Repair and align doors
6 Repair and align bumpers
7 Remove and replace fender wells
8 Repair and adjust tailgates
9 Repair and adjust liftgates
10 Repair and adjust sun roofs
11 Repair quarter panels
12 Remove and replace rocker panels
13 Repair and align roof panels
14 Repair and align rear section damage
15 Repair and align front section damage
16 Remove and replace radiators and supports
17 Remove and install weld-in panels
18 Replace fiberglass body panels
19 Straighten, repair and align body of vehicle
20 Straighten and align floor pans
21 Protect gas tanks prior to working on vehicle
22 Rough out metals
23 Align and fit sheet metal
24 Straighten deformed auto body sheet metal
25 Repair rust damage with sheet metal
26 Remove minor dents from sheet metal
27 Remove major dents from sheet metal
28 Repair tears in sheet metal
29 Hot shrink damaged metal areas
30 Arc weld vehicle body parts
31 MIG weld vehicle body parts
32 Cut and bend metal with O-A equipment
33 Repair rust damage with fiberglass
34 Repair damaged fiberglass
35 Fill and smooth areas with plastic body filler
36 Fill and smooth areas with body solder

DUTY G: Repairing Frame Damage

TASKS:
1 Diagnose type of frame damage
2 Straighten and align sag frame damage
3 Straighten and align twist frame damage
4 Straighten and align sway frame damage
5 Straighten and align diamond frame damage
6 Straighten and align mash frame damage
7 Repair combination frame damage
8 Diagnose damage on unitized frame
9 Repair damage on unitized frame
10 Repair frame damage on front drive vehicle
11 Repair or replace fuel tanks
12 Weld frames
13 Straighten, repair and align frame of vehicle

DUTY H: Repairing, Replacing, Adjusting and Installing Trim and Accessories

TASKS:
1 Replace locks and latches
2 Remove, replace and adjust power window control units
3 Repair or replace window raising and lowering mechanisms
4 Remove and replace seats and shoulder belts
5 Remove and replace floor mats and carpets
6 Remove and replace grills
7 Remove and replace interior trim and molding
8 Remove and replace exterior trim and molding
9 Drop and install headliner
10 Remove and replace weather strips
11 Clean interior fabrics
12 Clean vehicle for delivery
13 Clean and detail vehicle engine compartment

DUTY I: Painting and Refinishing

TASKS:
1 Apply corrosion materials
2 Apply primer surfacer
3 Clean and prepare repaired surfaces for painting
4 Dry sand vehicle
5 Wet sand vehicle
6 Sand surfaces for spot painting
7 Mask sections and parts
8 Finish painted surfaces
9 Heat dry painted surface
10 Verify color code match with manufacturers information
11 Verify color match with customer
12 Featheredge paint around repaired areas
13 Sand primer surfaces
14 Apply sealers
15 Mix paints
16 Apply lacquer
17 Apply acrylic enamel
18 Apply polyurethane enamel

19 Apply alkyd enamel
20 Apply undercoats
21 Apply clear coats
22 Mask vehicle for special painting effects
23 Apply special painting effects
24 Compound, polish and detail lacquer paint job
25 Compound, polish and detail enamel paint job

DUTY J: Removing and Installing Glass

TASKS:
1 Remove and replace windshield
2 Remove and replace rear glass
3 Remove and replace door glass
4 Adjust or align windows in doors
5 Remove and replace vent window assembly
6 Remove and replace quarter windows
7 Remove and replace sun roof glass
8 Remove and replace rear tailgate glass
9 Remove damaged glass and install replacement
10 Test for and seal leaks

DUTY K: Repairing Electrical Body Components

TASKS:
1 Align head lamps
2 Insure vehicle lights are operational
3 Service battery
4 Replace defective light bulbs
5 Repair or replace damaged electrical components
6 Replace turn signals or flasher units
7 Troubleshoot vehicle electrical system

Employability skills are a vital component of vocational education programs and should be incorporated into each occupational task list.